JOURNAL
OF THE
AMERICAN VETERINARY MEDICAL ASSOCIATION

In This Issue

(Contents continued on ad pages 2 and 4)

Volume CXVI FEBRUARY 1950 Number 875


NINETEEN
HUNDRED
TO
NINETEEN TEN
ONE OF THE MEMORABLE DECADES OF THE CENTURY
The discovery by veterinary scientists that an ubiquitous tick was responsible for the spreading of bovine piroplasmosis (Texas fever) led to systematic tick eradication in 1906—a project admitted to be the most soldierly undertaking of livestock sanitary science in all times.
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THOUGHTFUL PEOPLE CREDIT THE SOURCE OF THEIR WELFARE—IN THIS EVENT, FRED KILBOURNE, COOPER CURTICE, AND THEOBALD SMITH UNDER THE DIRECTION OF D. E. SALMON, CHIEF OF THE BUREAU OF ANIMAL INDUSTRY. THE MEMORABLE DECADE ALSO BROUGHT NEW LIGHT ON HOG CHOLERA, THE THEME FOR ANOTHER TRIBUTE TO VETERINARY SCIENCE.
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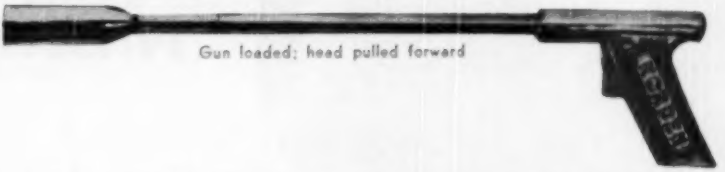
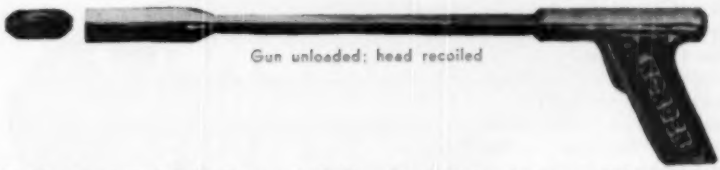


Gun loaded; head pulled forward



Gun unloaded; head recoiled

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CONTENTS

(*Continued from Cover*)

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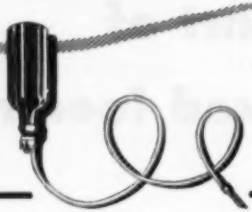

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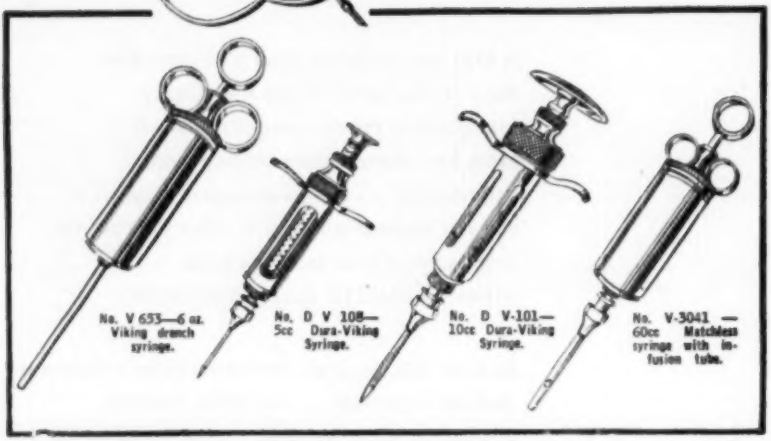

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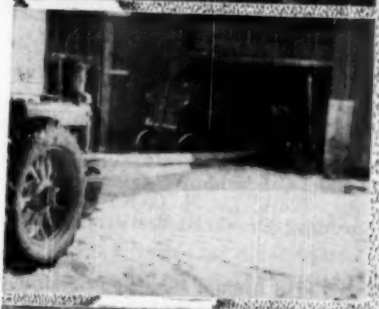

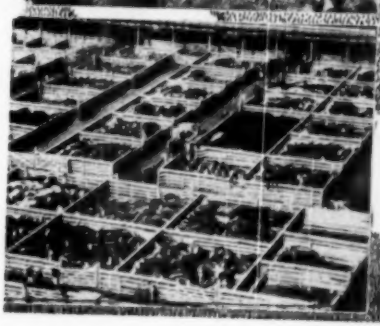

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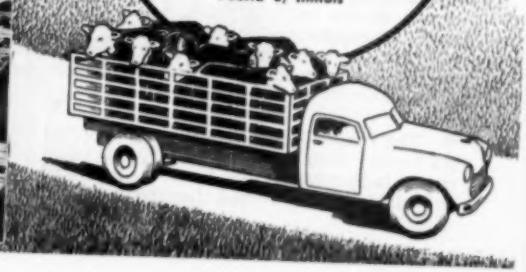

AVMA ☆ Report

Veterinary Medical Activities

◆ The Committee on Scientific Exhibits is preparing material for presentation at conventions of the American Medical Association and the American Public Health Association during 1950. The display will emphasize the prevention of human infection with *Trichinella spiralis* and *Cysticercus bovis*.

* * *

◆ AVMA Research Fellow R. F. Borgman, and the work which he and Dr. E. P. Reineke have done on thyroid gland activity in dogs, has been widely publicized. Clippings from newspapers all over the world acclaim this tangible evidence that radioisotopes are valuable in animal health research, and that not all the effects of the atomic work are in the field of the destructive A bomb.

* * *

◆ The services rendered by the AVMA to members and to livestock owners are graphically shown on a series of slides which officers and staff members are using in their talks to members and to state association conventions.

* * *

◆ The Code of Ethics exhibit is being widely used for state meetings. The committee which prepared this exhibit is working on a strip film to amplify it. Tentative plans call for copies of the film for student chapters in addition to those for use at meetings.

* * *

◆ The travel schedule for January was extensive. President C. P. Zepp, Sr., attended the Pennsylvania, Cornell, Tri-State (Memphis), and Michigan State Conferences, and association meetings in Louisiana and Virginia; President-Elect W. M. Coffee visited state conventions in Ohio, California, Washington, and Kansas, and the Intermountain (Salt Lake City) VMA; Dr. R. C. Klussendorf spoke at meetings in Wisconsin and North Carolina; Dr. C. D. Van Houweling met with the Indiana and Iowa associations.

* * *

◆ The Committee on Local Arrangements for the 87th Annual Meeting in Miami Beach, August 21 to 24, has been holding meetings regularly. Construction of the new air-conditioned auditorium is progressing, and prospects for a successful convention are excellent.

* * *

◆ The display "Brucellosis in Animals," which has been shown to a number of groups and has always stimulated added interest in the veterinarian and his relation to human health problems, has recently been shown for one month at the Cleveland Health Museum. Director of the Museum, Bruno Gebhard, M. D., writes, "We found this exhibit most interesting and appreciated having it during the month."

* * *

◆ Television programs featuring veterinarians are growing in popularity. Participants and members invited to participate can avoid mistakes and reduce the effort of preparing for the programs by reading pages 7 to 9 in the January JOURNAL.

* * *

◆ Keeping official agencies informed on the work and progress of veterinarians is one of the important but unpublicized activities of the Chicago office and its staff. *Occupational Outlook* recently requested an illustrated article for this Department of Labor publication, yearbook publishers have had annual progress reports, and magazines and individuals are supplied with information on specific subjects.

* * *

◆ The *Indian Veterinary Journal* devoted its issue of July, 1949, to celebration of its twenty-fifth anniversary of publication. This excellent *Journal* carried a silver cover indicative of its historic significance. The AVMA sent a letter of congratulations, and wished them continued success.

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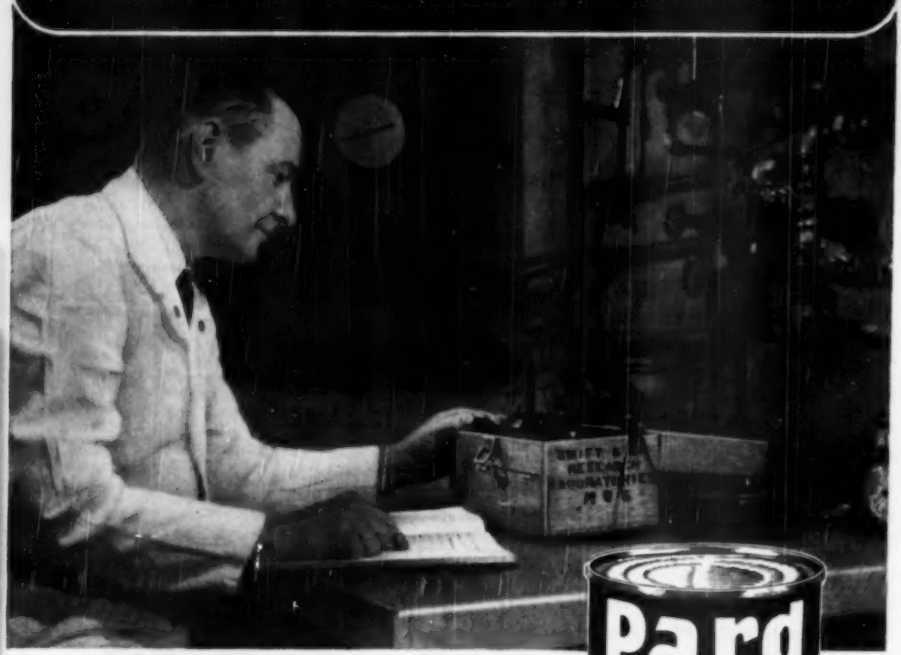

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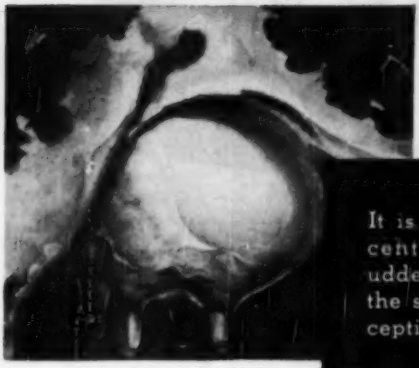

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1. Foley, E. J.; Stults, A. W.; Lee, S. W., and Byrne, J. V.: Am. J. Vet. Research 10: 60 (Jan.) 1949.

Nutrition Research With UREA

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"A complete lactation experiment with fifteen Holstein cows showed the nitrogen from urea as well utilized as that from linseed meal . . . when urea furnished not more than one-third of the total nitrogen intake."

Rupel, Bohstedt & Hart, University of Wisconsin, Jour. of Dairy Science, Vol. 26, Aug., 1943.

"Urea caused a prominent increase in the digestibility of protein (by sheep) . . . was apparently well utilized, being added to a ration already containing 12.9% protein."

Swift et al, Pennsylvania State College, Jour. of Animal Science, Vol. 6, Nov., 1947.

"Nitrogen retention by steers and lambs . . . was increased by the additional nitrogen supplied by urea . . . Feeding the 25% urea-nitrogen supplement . . . on alternate days as compared to daily and twice daily, had no effect on urea utilization by steers."

Dinning, Briggs and Gallup, Oklahoma Agricultural Exp. Sta. Jour. of Animal Science, Vol. 8, Feb., 1949.

★ ★ ★

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* *Keeney, E. L. and associates. Bull. Johns Hopkins Hospital 77:422, 1945*

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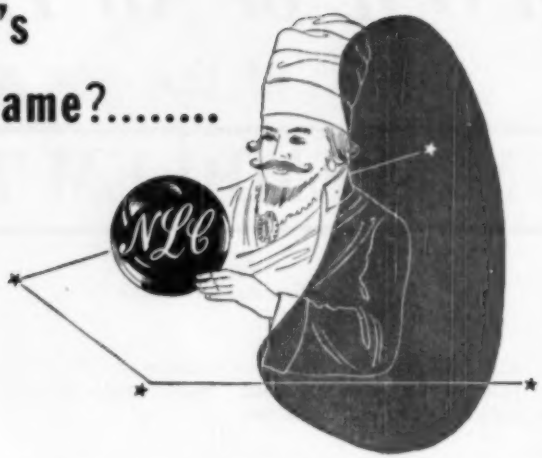

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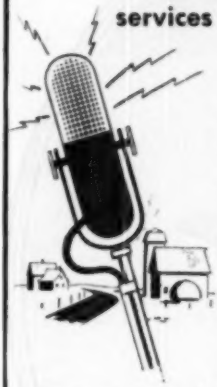

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Journal
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VOL. CXVI FEBRUARY, 1950 NO. 875

Symposium on Communicable Disease Problems of Veterinary Public Health

At the Detroit Session of the Association, the Section on Public Health conducted a symposium on communicable disease problems of veterinary public health. The members of the panel and their subjects were Dr. J. H. Steele, Atlanta, Ga., moderator, The Role of Veterinary Public Health in the Control of Communicable Diseases of Man; Dr. L. R. Davenport, Springfield, Ill., Veterinary Public Health Problems in the Middlewest; Dr. A. E. Heustis, M.D., Lansing, Mich., Communicable Disease Control; Dr. R. J. Helvig, Washington, D. C., How Can the Veterinarian Improve Meat, Milk, and Poultry Inspection in His Community?; Dr. Robert Willson, Detroit, Mich., What Are the Veterinary Public Health Problems of a Large City? The following is a condensation of the remarks of the symposium participants.

Moderator J. H. Steele (Atlanta, Ga.).—This is the fourth panel devoted to veterinary public health problems. As in the past, we have tried to bring experts from all fields of public health that are concerned with the problems of veterinary public health. Dr. Albert E. Heustis, commissioner of health of Michigan, is our medical expert on the board. He will discuss communicable disease control from the viewpoint of the state health officer. Dr. L. R. Davenport, public health veterinarian, Illinois Department of Public Health, will be our authority on veterinary public health problems in the Middlewest. Dr. Robert L. Willson, director, Bureau of Food Sanitation Inspection, is our expert on veterinary public health problems of a large city. To balance our board of consultants, we have Dr. Raymond J. Helvig of the Milk and Food Sanitation Section of the Public Health Service. Dr. Helvig has had broad experience in milk and food handling sanitation, the first phase of public health to be developed, and there is need for additional expansion at this date, almost one hundred years after food sanitation was inaugurated in Germany.

(The papers of the Symposium follow.)

The Role of Veterinary Public Health in Control of Communicable Diseases of Man

JAMES H. STEELE, D.V.M., M.P.H.
Atlanta, Georgia

Today, we all face a continually changing world. There has never been a time in history when there have been more advancements and changes than in the first half of the twentieth century. In the field of biological sciences, we find new problems continually appearing. Before World War II, the field of veterinary public health was largely confined to milk and food sanitation and the laboratory, with an occasional veterinarian in public health administration. The only organized veterinary service for the control of communicable diseases was in the Department of Agriculture, where major emphasis was placed upon diseases of economic importance. During World War II, conception of the services of the veterinarian to public health was revised by the excellent services provided in the military forces, occupational government, and international relief assistance organizations. Many of the medical officers of the Public Health Service who were assigned to task forces were impressed by the invaluable services of veterinarians in communicable disease control, food sanitation, labora-

Chief, Veterinary Public Health Division, Communicable Disease Center, Public Health Service, Federal Security Agency, Atlanta, Ga.

tory services, and public health administration. Out of this grew the establishment of veterinary public health service. Today, on the threshold of the second half of the twentieth century, veterinary public health faces a challenge that will tax the ingenuity of all of us.

In the field of communicable disease control, there are two immediate problems in which the veterinarian can play a major part. They are control and eradication of rabies and brucellosis. Rabies can be controlled and eventually eradicated with the tools we have at hand. There are some difficulties in dealing with wild animal reservoirs, but most of these are due to lack of understanding, misinformation, and inertia; and, in some cases, we see problems that we have not been able to solve because of the lack of ecologists. The control of brucellosis calls for coöperation between agricultural and health authorities. Health authorities can support control and eradication programs by investigation of human cases of brucellosis, which will provide immediate public health justification to supplement the economic reasons for the control and eradication of this disease. In addition to public health, the veterinarian has the responsibility of recommending milk and meat sanitation regulations to protect the public. With the combined efforts of health and agricultural authorities, which see as their objective the eradication of this disease, we can look forward to a successful program.

Many scientists have referred to the last decade of the nineteenth century and the early period of the twentieth as the "golden age of bacteriology." During that period, the most fundamental discoveries were made in this field. I think we can also look upon the first half of the twentieth century as a similar period of opportunity for research on virus and Rickettsia reservoirs. The study of viral and rickettsial diseases of animals has been a continually expanding field for veterinary medicine since Loeffler and Frosch first reported a virus as the causative agent of foot-and-mouth disease. Since then, many animal viral diseases of public health significance have been identified, such as the encephalitides, lymphocytic choriomeningitis, psittacosis, and Q fever. Future investigations in this field by public health authorities will devote more attention to possible animal reservoirs of disease in nature. As new problems such as Q fever are revealed, the responsibility of veterinary public health increases accordingly. The control of Q fever in man is dependent upon the control of the disease in animals. It may be that, in certain instances, the chain of infection can be broken by a physical barrier; but even if this physical barrier should be 100 per cent effective, the disease will continue to be intercommunicable between animal and man.

No doubt, in the future we shall find other problems which demonstrate the importance of the veterinarian to the broad field of public health. The role of such diseases as the infectious hepatitides of animals and man, the control of leptospirosis, the control of industrial occupational diseases of animal origin, the solution of the epidemiology of the encephalitides and their relation to poliomyelitis, and the investigation of arthropodal diseases, are all problems that will challenge the public health and veterinary investigators. The solutions of these problems will not be found by individuals but by the teamwork of investigators concerned with the many sciences and skills that make up public health. It will be important for the public health veterinarian to provide the skills and information expected of him to make this team a success.

Beyond the problems of communicable disease control, we have those that deal with food sanitation, especially those foods of animal origin. Milk sanitation in most parts of the country is receiving adequate attention from the public health agencies, although in many instances this activity could be aided by the services of veterinarians in the control of brucellosis, mastitis, and in the continued bovine tuberculosis testing which is needed in many areas to insure grade A milk. Many local health agencies have not been sufficiently concerned with these problems to require annual testing for tuberculosis and brucellosis by local distributors of raw milk. In some instances, we find these regulations also apply to pasteurized milk and dairy products. Milk is man's most valuable food and it is largely the responsibility of veterinarians to insure its economic production and wholesomeness.

The problems of interstate meat and poultry inspection will become increasingly important with the decentralization of these industries. The Milk and Food Hygiene Committee of the American Veterinary Medical Association, in its 1948 report, states that one-third of the meat and meat-food processed in the United States is without adequate inspection, and that only 10 per cent of the poultry consumed is handled under adequate sanitary conditions. To develop sanitation services necessary to meet these problems would require the additional services of 500 public health veterinarians, distributed in state and local health agencies, and they would only be able to supervise the activities of lay inspectors.

A problem that is seldom discussed in food sanitation is fish inspection. The Vet-

erinary Corps of the U. S. Army did a magnificent job in developing this service, but it has been adopted by few public health agencies, largely because of the lack of trained veterinarians.

The advancement of physical sciences has resulted in new problems for the biological sciences. The most important of these is the discovery of atomic energy. What the problems of veterinary medicine and public health will be in this field are just being uncovered. In the courses on atomic energy and its uses given by the nation's military establishments, it has been pointed out that the problems which deal with animal health, food products of animal origin, and the control of waste products which may endanger public health are the responsibility of veterinary medicine. The Public Health Service plans to give all of its veterinary officers some training in this field and eventually to extend similar training to veterinarians in state and local health agencies.

These problems offer a challenge for the second half of the twentieth century. To provide the services expected of us, we must be well trained, flexible, and adaptable to all situations. To provide for this adaptability, it is essential that the professional schools of veterinary medicine give sound training in the principles of veterinary public health, and that those students pursuing public health education obtain further training in research at graduate institutions.

Communicable Disease Control

A. E. HEUSTIS, M.D.

Lansing, Michigan

My job is to protect the health of the people of Michigan. Dr. Leeder and the veterinarians who have been assigned to our staff tell me that there are more than 75 diseases of animals that are transmissible to man. Fortunately, many of these diseases are not yet common in the United States, but with the increasing ease of travel between countries, we must consider them, too.

The U. S. Public Health Service estimates that there are approximately 30,000 cases of brucellosis in this country each year; and with all due respect to my medical colleagues, this disease is notoriously poorly diagnosed. Many cases go unrecognized.

In addition to the long-term illness and incapacitation due to this disease, the economic loss is heavy. Dr. I. Forest Huddleson, of Michigan State College, and Dr. B. T. Simms of the U. S. Bureau of Animal Industry, have estimated that upward of $50 million are lost due to brucellosis in cattle, hogs, and other animals.

To those of us in official public health in Michigan, it seems that the diseases of animals are becoming of sufficient importance in relation to diseases of human beings so that some system must be worked out whereby doctors of veterinary medicine report such diseases to local or state health departments, as physicians are required to do. As I understand it, some states already have adopted such a procedure. In Michigan, we are trying to develop some type of procedure on a voluntary basis.

We say the control of any disease is based upon knowing where and how frequently that disease occurs. We have had a public health veterinarian in the Michigan Department of Health for some time, and he has been extremely helpful. He has helped to do some things that are related indirectly to veterinary medicine, but yet are extremely important. He has also helped to develop better relations between the practicing veterinarians and the local full-time county and city health officers. He understood the problems of the medical health officers on the one hand and those of the practicing veterinarians on the other. In many instances, he succeeded in promoting coöperation between the groups to the benefit of the entire community.

The veterinarian on our staff is helping to improve relations between the Department of Agriculture, the Health Department, and the school of veterinary medicine. He has been assigned to do epidemiologic investigations, and he has participated in local control and educational campaigns, especially against rabies and salmonellosis.

People speak of a public health team. I heartily favor such a team. The public health trained doctor of veterinary medicine is a valuable member of such a team. It seems only a question of time until other state health departments will recognize the

(Continued on page 86)

Commissioner, Michigan Department of Health, Lansing, Mich.

Calfhood Vaccination: Expect No Miracles.—Isn't it about time that we stopped asking too much of vaccination against brucellosis? Wouldn't there be less disease and fewer disappointments if we didn't think in terms of immunity? We know that calfhood vaccination gives enough added resistance to make it invaluable as an aid in stamping out brucellosis. Let's be satisfied with that.—*J. W. Bailey, D.V.M., Successful Farming, Oct.*, 1949.

value of a trained public health veterinarian, and will realize that their disease-control programs can be much more effective with his help.

Veterinary Public Health Problems of a Large City

R. F. WILLSON, D.V.M.
Detroit, Michigan

Public health problems in a large city, which require the observation, experience, and technical training of the veterinarian, are divided into two classes. The first classification concerns actual animal disease control, such as rabies and psittacosis eradication. The second concerns inspection of meat, milk, and other types of food. Inspectional procedures involving meat, meat food, and milk products require trained personnel for the detection of diseases or conditions which render the food unfit for human consumption, either by the transmission of an animal disease, or by causing an illness entirely unrelated to the specific animal disease.

Rabies is a disease which confronts the health officer in any community. Certainly, the disease is a grave menace to the public health, particularly in large cities, where both canine and human populations are greatly concentrated. It is estimated that there are at least 120,000 dogs in Detroit, and it is easy to imagine our consternation when we are confronted with a rabies epizoötic. In spite of a law which requires that all dogs permitted on the street must be leashed and vaccinated, and despite an efficient dog-catching force of 21 men and six dog wagons, we are still confronted with an occasional outbreak of canine rabies. Authorities agree that there are only two points necessary to control rabies: (1) Control the stray dog. (2) Vaccinate.

It is not necessary to go into detail on control measures. The incidence of canine rabies is on the increase in Detroit. Further control measures were recently instituted which consisted in the issuing of violation tickets to all owners of dogs found running on the streets. The tickets are issued at the municipal dog pound by a policeman when the owner claims his dog. In addition to the fine connected with the ticket (usually $10.00), the owner must pay for the vaccination ($2.00), plus a $1.00 pound fee, plus a license fee of $2.00, if the dog is not licensed. The owner of an unlicensed dog, then, must pay approximately $15.00 for allowing his dog to run the streets.

Psittacosis has received much attention in the past four years. Improved methods of diagnosis have probably contributed materially to this increase. All cases of psittacosis in man are reported to the Department of Health. Investigation of these cases is assigned to the veterinary staff of the Department. A complete epidemiologic study of the case is then prepared. Sample birds are obtained and sent to the laboratory for diagnosis of the carrier state. Positive diagnosis in the sampled birds automatically results in seizure of the remainder of the birds. The writer has supervised the destruction of over 850 psittacine birds. One of our veterinarians contracted the disease after assisting in the destruction of 125 fowl.

Permission to destroy infected birds is obtained from the owners on the basis that they are a menace to the public health.

Meat inspection in the large city offers no serious problems, provided that existing local laws are comparable to those of the Bureau of Animal Industry. The Detroit ordinance states: "The standards, rules, and regulations for the inspection of live animals, carcasses, meats, and meat-food products and for the judging of their fitness for human food shall be those now in use by the Bureau of Animal Industry of the United States government, or shall be hereafter adopted." This paragraph is a very important part of any local ordinance.

The problem of lack of veterinary personnel has been temporarily solved by training lay inspectors to work under veterinary supervision. Training lay people to recognize normal carcasses or parts of carcasses is a comparatively easy job. It necessarily follows that they immediately recognize the abnormal. No attempt is made to require that the lay inspector name the condition.

(Continued on page 87)

Director, Bureau of Food Sanitation Inspection, Detroit Department of Health, Detroit, Mich.

An Arizona inventor, Alfred Paul, Jr., has patented an insecticide-dusting chute with a bellows-like floor that is automatically operated by the weight of the animal, according to *Science Service*. When an animal steps on the chute's depressible floor, which is mounted on a small pit, the compression drives just the right amount of insecticide dust through nozzles in the side walls of the chute.

It is exceedingly difficult to produce swine erysipelas by experimental inoculation.—*H. C. H. Kernkamp, D.V.M., Minnesota.*

It is only required that he retain the material for final disposition by the veterinary inspector.

Veterinary Public Health Problems in the Middlewest

L. R. DAVENPORT, D.V.M.
Springfield, Illinois

Although the Middlewest embraces several states with varied social and economic conditions and interests, it may be assumed, I think, since there is an animal-human disease relationship common to the several states, that there is a common veterinary-public health relationship, and that Illinois may be considered representative in a discussion of veterinary-public health problems in this area.

As in other areas, veterinary public health in Illinois has undertaken the consideration of such major aspects of the animal-human health relationship as: the investigation and control of animal diseases transmissible to man; the investigation and control of conditions, involving animals, of danger to the health of man and the production of an adequate supply of wholesome animal food products with an over-all aim of coöperatively coördinating veterinary and public health programs and practices toward a more complete and efficient protection of animal and human health.

Obviously, veterinary public health in Illinois, as elsewhere, involves social and economic groups and personalities which differ in interest and attitude, often to a point of conflict. Here lies the major problem—that of orienting the various groups and interests in the propriety and function of veterinary public health through education.

Since veterinary public health revolves primarily around the veterinary and human medical groups, the major concentration of effort toward orientation has been to create an awareness within the two groups of the ways in which veterinary science can serve the public health and to stimulate both groups to utilize veterinary science in the various public health programs and practices. This does not mean that the educational effort has been confined to these groups. Instead, consistent, concurrent educational effort has been applied to all of the social and economic organizations and interests involved, in an effort to converge the thinking and understanding upon a focal point of appreciation and coöperative support of the over-all veterinary public health effort. In our educational program, emphasis has been placed upon the necessity of establishing within the veterinary and agricultural groups a better appreciation of the social, or public health, aspects of animal diseases and a better appreciation of the benefit, both social and economic, to be realized from more efficient animal disease prevention and control.

Needless to say, the application of various projects and devices to establish the necessary basic over-all understanding and appreciation presents many difficulties which we are inclined to call problems. It is my personal contention, however, that such difficulties should not be considered problems *per se* but, instead, should be thought of as normal reflections of inadequate, ineffective education. This feeling comes from the observation that when an extemporal request is made of veterinarians to assist some particular phase of the public health program, the response is favorable; but when veterinarians become familiar with the ways in which they can assist the public health, compatably with economic interests, the response is voluntary and enthusiastic. Also, when public health officers and physicians of the human medical group become familiar with the veterinarians' desire to assist in the public health program, they are receptive, even to the point of voluntarily initiating joint coöperative veterinary-public health projects. Moreover, although the traditional estrangement of social and economic interests may normally be expected to complicate attempts to secure economic support of veterinary public health, it has been observed that those representative of the various economic interests are aware of the benefit to livestock and public economy to be realized from better animal health and are, therefore, appreciative of the objectives and receptive to the program of veterinary public health. Thus, through the assistance of sympathetic leaders among the various economic groups, the education of the various public economic groups and interests and the securement of their support of veterinary public health becomes much less difficult.

In the light of these observations, it appears that understanding and appreciation of the propriety and purpose of veterinary public health are fundamental to the efficiency with which the various projects are applied toward the accomplishment of the over-all veterinary public health objective. Accordingly, it appears that, in any geographic area, the basic and constant necessity is education to prevent and re-

Consultant in veterinary medicine, Division of Communicable Diseases, Department of Public Health (Illinois), Springfield.

move the difficulties—the conflicts and opposition—arising between the various groups and interests involved, which tend to obstruct and impede the accomplishment of the objective.

The veterinary public health problem in the Middlewest, accepting Illinois to be representative of the Middlewest, has been, and is, one of education, and it is suspected that we share this one basic problem with many other geographic areas, regardless of the interests and relationships which may exist.

How Can the Veterinarian Improve Meat, Milk, and Poultry Inspection in His Community?

R. J. HELVIG, D.V.M.
Washington, D. C.

Much has been said in recent years about the contribution made by those veterinarians who have devoted all or most of their time to public health work in the fields of animal disease control, meat inspection, poultry inspection, milk and food inspection, and research. On the other hand, little has been said about the contribution to public health made by those veterinarians who, in addition to their private practices, have been active in public health work — either behind the scene as active citizens or on part-time bases in actual inspection work.

In this discussion, I am taking the liberty of referring to the health department as the administrative body for the meat, milk, and poultry inspection programs on the local level, because these activities are usually undertaken by the local health department, even when administered by some department other than the health department, on the state or federal levels.

Figure 1 shows the organization of a health department in a small city*, and capacities in which veterinarians can logically serve in a local public health program.

Keeping in mind this organization plan and the place of the veterinarian in it, we might well consider, briefly, basic steps in inaugurating a meat, milk, or poultry inspection program. First of all, it is necessary to launch an organized and planned educational campaign to point out to the industry concerned, and to the consumer, what it means to have a well-organized and adequate inspection program. Second, basic legislation should be passed requiring a certain level of sanitation in the various food processing plants and a certain level of wholesomeness and quality for the products to be sold. In view of the current trends of

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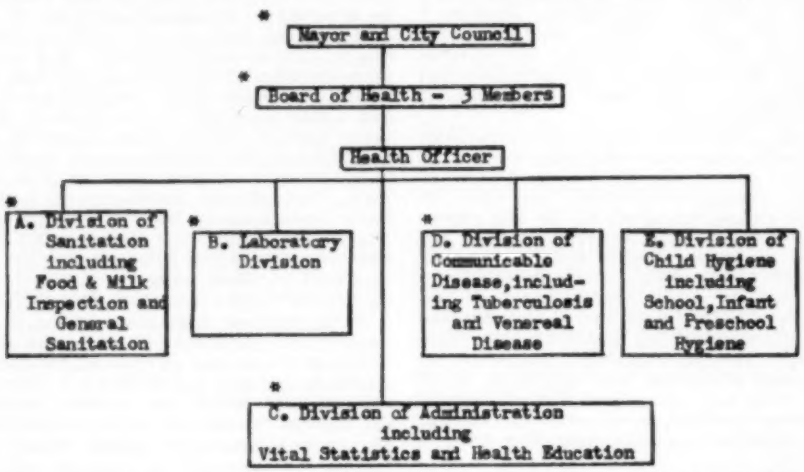
*From Smillie: "Public Health Administration. The Macmillan Company, 1947.



—*Courtesy The Macmillan Co.*

Fig. 1—Plan for organization of a health department in a small city. The asterisks indicate capacities in which veterinarians can logically serve in a local public health program.

shipping meat, milk, and poultry for distribution over wide areas from the central processing plants, it is of utmost importance that the requirements be uniform on a state-wide basis. Our ultimate goal should be to have legislation that is uniform in all states, with uniform enforcement practices applied throughout each state, but with the supervision, and possibly even the administration, of the program carried out on the state level. And third, after legislation has been passed and the program placed in operation, the educational programs referred to in the first step should be continued by conducting organized training courses for the managers, operators, and employees of the various plants which handle meat, milk, and poultry and by continuing to keep the consumer conscious of his responsibility in buying only those products which are wholesome and safe for human consumption.

SUMMARY

How, then, can the veterinarian improve meat, milk, and poultry inspection in his community? Referring again to the organization plan, I would like to answer this question briefly as follows:

First, as a citizen of a community and as a member of local civic organizations, a veterinarian can stimulate interest in, and support for, these programs by accepting every opportunity to bring to groups of people or individuals, either by the press or by talks, the needs for such programs.

Second, as a member of the city council, a veterinarian would have an official vote in establishing these programs, in addition to having an influence on the members of the city council as a whole.

Third, as a member of the board of health, he can help to establish and guide the health department in the formulation and the administration of the program.

And, finally, as an active member of the health department either on a part-time or full-time basis, he can actively help carry out these programs.

DISCUSSION

DR. STEELE: The panel is now open to questions.

DR. L. E. FREDERICKSON (Highland, Ill.): Is it the intention of the Public Health Service, in the next issue of the Ordinance and Code, to extend the tuberculin testing to six years and have that accepted by the Public Health Service as proper compliance with the first item?

DR. HELVIG: This is the wording of item 1-R with regard to tuberculosis: "In the case of milk for pasteurization, all herds in addition thereto shall be tested for tuberculosis within — years (limited to two) after the adoption of this ordinance, and at least every six years thereafter. In the case of milk not for pasteurization, all herds in addition thereto shall be tested and found free of tuberculosis before any milk therefrom is sold, and all herds shall be retested at least every twelve months thereafter; said tests, etc., shall be in accordance with the Bureau of Animal Industry requirements."

DR. STEELE: Dr. Davenport has had some experience with that and might be able to answer the question further.

DR. DAVENPORT: In the appraisal of the two programs, the accreditation on the three- and six-year basis, I think we should consider the intensity of the testing. For instance, on a six-year basis, the animals in an area or a county must all be tested, and the incidence of tuberculosis must be 0.2 per cent or less to be eligible for a six-year accreditation. To reaccredit that area on another six-year basis, the area at the end of six years again must be retested.

On a three-year basis, the incidence of infection may be up to 0.5 per cent. The incidence of infection and intensity of testing of any area, I think, would be a factor to be considered in the appraisal of those programs.

DR. WILLSON: Can a small community actually afford to have full-time veterinary service?

DR. HELVIG: Unfortunately, I don't think they can at the present time. Maybe eventually, the public will realize the importance of the work the veterinarian can do in a community, and will provide for that service at an adequate salary. It is not a problem for the individual veterinarian to handle as much as a problem for the profession as a whole.

We, as a profession, must recognize and accept the responsibilities that the general public places upon us for the communities. If we don't, lay inspectors will take our place. In many local communities, the sanitarian, though not qualified, is setting up meat and poultry inspection programs because he has seen the dire need for them and because he has been forced to by the demands of the consumer and his health officer.

Although it isn't remunerative work now, veterinarians should take it for what it is worth, and try to do the best job possible. I am thinking of the set-up which Dr. Meyer organized in Grand Rapids, Mich. He called together all the veterinarians in the community and placed the problem before them, discussed it with them, explained that they carried a responsibility as far as meat inspection is concerned, and that if they all shared it, even though it wasn't a very remunerative project at the present time, the veterinarians would fulfill their obligations. The veterinarians are doing the meat inspection work on a part-time basis.

DR. STEELE: How does the veterinarian fit into the local health department?

DR. HEUSTIS: The organized local veterinary association can make a real contribution to the community's health by asking a lot of embarrassing questions of the people who are supposed to be doing public health work and by rolling up its sleeves and, for pay, doing some of the work that must be done. I am fully in favor of that.

Specifically, I believe that local veterinary associations can find out, first, if they have a local health department; second, if they have a local health department on paper only; and third, what policies and programs concern the things that doctors of veterinary medicine are interested in.

The local health officer should be invited to ex-

plain the situation before a meeting of the local veterinary association. If there are financial shortcomings, perhaps the local veterinary association can provide factual material that will enable him to better justify his problem to the body that appropriates the money.

When I was a local health officer in a rural county of 20,000 people in western Michigan, we met regularly with the local veterinary association. The veterinarians came to the health department and met on a quarterly basis, or oftener, when problems arose.

We had an undulant fever campaign. Before it was presented to the public, it was talked over with doctors of veterinary medicine, who made suggestions. Veterinarians and others are often asked to coöperate in public health programs after somebody has formulated the program. It is much easier to coöperate in the program after one has helped with its planning.

It will be some time before small communities can afford the full-time services of veterinarians. That time will never come unless those of us who are really and truly interested in public health from a medical and general viewpoint, get together and convince the folk.

There was a time when people didn't wear shoes. There was a time when we didn't care about our water supply—and we found out about that rather dramatically. A lot of people got sick all of a sudden and demonstrated the need for community health programs.

Each of us must push in the right places. This chart (figure 1) indicates very definitely where veterinarians and others interested in public health can get in and work. I sincerely urge every one of you to go back home and see if you have a local health department. If you do, is it worthy of the name? Is everything being done that can be done with the facilities available?

DR. K. S. YOUNG (Austin, Texas): There is much discussion about the place of meat and milk inspection. Should it be under preventive medicine? Many veterinarians believe that the wholesomeness of meat and the health of the dairy cattle producing the milk should be under preventive medicine, and the reporting of these conditions should be the responsibility of a medical officer in charge of preventive medicine.

I would like to have an opinion on that.

DR. HELVIG: Again, we can refer to education. We must educate the entire health department that, as a veterinary profession, we can take our place in the health department. In a number of states, a veterinary public health section or division has been set up. The organization plan of the U. S. Public Health Service places milk and food inspection in the Division of Sanitation, however.

This matter of reporting a disease outbreak is certainly very lax. It could be used very effectively in justifying our various programs. Dr. Steele has written an excellent and complete paper on that, and he might want to elaborate.

DR. STEELE: In reply to your question, Dr. Young, the trend in local health departments, both on a county and on a city basis, has been to divide their services into three main branches, bureaus, or divisions. One is the administrative bureau which handles all the housekeeping and some of the extra activities that do not fit into either of the other bureaus. The other bureaus are communicable disease control or preventive medicine, and environmental health services or the division of sanitation or sanitary engineering.

The contributions of veterinary medicine will be in the biological sciences. Their fundamental training always stresses the control and eradication of the problem, not treatment of the condition after it appears.

People in environmental health think in terms of physical barriers against disease—they heat-treat or use chemicals, referring to either milk or water, or they provide screens or attempt to establish some physical barrier between the etiologic agent of disease and the host.

In fundamental training, in the veterinary schools, and in public health schools and in other graduate training, we have always asked: What is the biological source of the disease, and how can its chain be broken?

We may think of the break in the chain by physical means as being an expedient, but we always have as our objective the destruction of the biological reservoir of the disease, and for that reason I feel that the veterinary public health workers will be able to make their best contribution in the field of preventive medicine where they can practice this philosophy, and where they are working side by side with the medical officer who understands their thinking.

Dr. Heustis, would you like to comment along administrative lines?

DR. HEUSTIS: In the Michigan Department of Health, we have a division of disease control. The Veterinary Public Health activities have been in this division for many years.

There may be some small communities, such as Branch County where I used to work, serving 25,000 people, where there might have to be some compromise with part-time veterinary service. It would be my opinion that if there were full-time veterinary service the problem should be directed (even in a small, local area) and be made the direct responsibility of the local officer in charge.

DR. STEELE: Are there any other questions?

DR. ROWLES (Topeka, Kan.): May I make a comment instead of asking a question at this time? I want to offer a suggestion.

If any of the men here are from communities that intend to start meat inspection, someone who has had considerable experience with the BAI, or perhaps who is retired, could offer suggestions and work with them. They will find this one of the best investments they have ever made.

A veterinary course in school or practice does not provide the training needed to conduct meat inspection.

DR. STEELE: "What can we expect in the way of relative coöperation from nonofficial voluntary agencies, such as humane societies, in rabies control programs?"

DR. WILLSON: I can only answer the question from our experience in Detroit.

Our local humane society has helped us immeasurably in rabies-control work. The success we have had with this humane society has been due to the straight thinking of the executive secretary or superintendent of the shelter, who is vitally interested in rabies control. He recognizes the disease; he realizes that there are large numbers of dogs needlessly destroyed when there is a rabies outbreak, because the owners become fearful of their own dogs. The humane society coöperates with us 100 per cent.

In Detroit we have another agency, the Anti-Cruelty Association, an off-shoot of the Michigan Humane Society, which also coöperates with the Department of Health in a very fine manner.

DR. STEELE: Dr. Davenport, do you wish to discuss any of the nonofficial agencies, especially those in rural areas, that can assist in the development of disease-control programs?

DR. DAVENPORT: We have found the kennel clubs extremely valuable in establishing voluntary area rabies-control programs. These people have a keen appreciation of the need for the elimination of this disease. In one instance, the president of a kennel club contributed articles to the local newspaper every week. The public had constant information regarding rabies and the necessity for its control.

Not long ago, I sat in on a rural youth conference, which was sponsoring a program for community development and improvement. Their plan proposed that councils be appointed in the small communities, such as villages with the contiguous area. The purpose of each council was to appraise the needs of its community, including appraisal of public health needs. They would then set about evaluating the facilities and personnel available for the correction of any discrepancies existing, and the improvement of the over-all conditions.

DR. STEELE: Are the official health agencies willing to assist the local practitioners in diagnostic diseases of animals?

DR. WILLSON: Our department attempts to assist the practitioner in every way possible in the diagnosing and reporting of difficult diseases. Knowing all of the local practitioners, I have been called many times, and we have set up a program for the reporting of the number of dogs vaccinated against rabies. We also have set up a program for the reporting of cases of Weil's disease, and if the veterinarian so desires, we take a sample of blood, or ask him to get it for us, and send it to the National Institutes of Health, or to Dr. Karl F. Meyer at the Hooper Foundation in California. When we have the necessary equipment and facilities, we make the diagnosis in our own laboratories.

Mobile Phone

I have been asked to discuss the mobile phone, which we have had in constant use for approximately a year and a half in our practice. I want to point out that I am talking strictly from our experience and the same might not work out as well for other veterinarians. A little later, I will show a few slides which indicate the application of the phone in general practice. Also, I will put a call through from the stage to the car which is stationed some distance from the Book-Cadillac Hotel. This conversation will be amplified so all can hear.

Many people have talked to me about this service, and one of the first questions is regarding the cost and how often I use it in my daily practice. Therefore, I asked the telephone company to give me the total cost including tax, office and home calls to the mobile unit, and any other expense such as installation that was connected with my mobile phone for the eighteen months it has been in use. This amounted to $642.

Fig. 1—Dr. Stephenson shown using the mobile phone on a farm.

We also kept a record of the monthly use of the mobile phone for the past year, showing calls to the car and from the car. The number of calls to the car ran consistently higher than those from the car, ranging roughly from 20 to 50 calls a month.

We have enjoyed excellent coöperation from the Bell Telephone Company for the few times the sets have "gone out." The mobile repair man gets on our trail and repairs the unit wherever we may be stopped.

We try to make the clients pay for the mobile telephone service as much as possible. On emergencies that we are able to reach early as a result of the mobile service, we charge one or two dollars extra. Calls to the unit are charged to the phone from which the call originates; therefore, we urge clients to call direct. We find the clients appreciate being able to reach us at any time. We would find it extremely difficult to operate our practice without the benefit of the mobile telephone.

The slides show a large wall map on which the office girl arranges pins on farms where our service is requested. The different colored pins indicate the urgencies as we lay out the work for the day and future days.

In brief, the advantages of the mobile service are:

1) Mileage and time saved in the working day.

2) Ability to reach emergencies quickly.

3) Peace of mind,—because one is in constant touch with clients, office, and home.—*D. R. Stephenson, D.V.M., Rockford, Ill.*

Presented before the Section on General Practice, Eighty-sixth Annual Meeting, American Veterinary Medical Association, Detroit, Mich., July 11-14, 1949.

Hidden Costs

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VETERINARIANS and livestock breeders and producers of the United States and Canada have developed the healthiest livestock and poultry in the world. Many ailments which plague other countries are not known here, at least as first-line enemies. Our location is not conducive to some diseases, and combined efforts have kept others from being introduced. The determined attitude to eradicate, rather than to live with, certain diseases has resulted in the success of several eradication programs. (The United States should look to Canada for a lesson on hog cholera.) We attend our local, state, and national meetings and read current literature in order to keep abreast of new developments and to improve our services. Most presentations at our meetings show the positive side of the picture—progress. In spite of this generally bright side, we must admit that there are some dark spots. It is my responsibility today to discuss briefly one of the spots we know needs attention.

The 1947 U. S. Department of Agriculture census, the latest complete at this date, shows the combined value of the beef cattle, dairy cattle, hogs, sheep, horses, and mules to be $11,251,985,000, and for chickens and turkeys to be $726,865,000. No figures are obtainable for goats, ducks, and geese, but we know it is sizable. If the sale value of the meat, hides, pelts, mohair, dairy, and poultry products were added, the figure would be almost incomprehensible. There is no method of evaluating pets, but pet owners are concerned in this problem.

WHERE HIDDEN COSTS ORIGINATE

Owners of livestock, poultry, and pets annually spend several hundred millions of dollars from which there is no benefit and, in some cases, there is much more to the cost than just the cash outlay for drugs and/or biological products. These "hidden costs," most of them self-inflicted by the purchaser-user, are numerous, but all finally are catalogued into some half-dozen categories.

1) Purchase of highly-advertised patent and proprietary products, many of which are of doubtful value from the outset.

2) Purchase of good products that are used on hunches, or because Joe Jones once used it for a case about like this, or for any one of dozens of other so-called reasons.

3) The use of biological products without thorough knowledge of their value, danger, and limitations. Many of them are administered without justification; impossible results often are expected, and sometimes serious consequences result.

4) The use of improperly stored and outdated, impotent biological products.

5) Highly advertised, complex mineral mixtures and medicated mineral mixtures and salts have found a fertile field.

6) The feeling of false security which accompanies the above practices often leads to negligence or oversight which later prove costly. Home treatments have been known to mask and muddle the true picture so that the veterinarian, when called, had much difficulty in unraveling the case.

What are the primary channels through which laymen make direct purchases? This is subject to breakdown, but it is mainly through (1) direct sales from certain producers to the user; (2) the drugstore; (3) coöperative organizations; and, (4) feed stores, pet shops, and general mercantile stores.

This next statement is not a general indictment of veterinary medicine, but there are individuals among us who sell large volumes of material without even questioning what it is for, and offer no advice or warning on how to use it. This practice is not fair to the client, and it is not an honest expression of the service we are pledged to render.

Surely, the major part of this audience is familiar with many examples of this type of activity. Since earliest times, there have been drug concoctions on the market that were said to be specific for certain diseases. The first three decades of this century saw a heavy play on hog cholera and brucellosis, erroneously called abortion—the latter term playing right into the hands of the peddler. One of the most notorious examples is the case of the man Bowman, who, in the middle 1920's, sold brown sugar and bran—with a guarantee—to cure "abortion" disease. It took a long time to stop him, and his profits were large. During the 1930's and early 1940's, there were many preparations on the market for the cure of coccidiosis in chickens. They couldn't miss, as the recommendations for use and guaranteed results were built around the natural, unaltered

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course of that disease. Right now, there is on the market a mineral mixture that is advertised to cure and prevent brucellosis.

MISUSE OF DRUGS

State regulatory officials tell us that the volume of medicines and medicated mineral mixtures peddled is large, extremely so in some states, but that reliable figures aren't available. Some data are available for veterinary medicines that move interstate. As Dr. H. E. Moskey reported[4] in September, 1948, "Calculations based on published data indicate that the sale of drugs for veterinary use amounts to approximately $110 million annually." A look in the windows of the general mercantile stores and drugstores, even in areas where adequate and first-rate veterinary service is available, will support these observations.

The vicious abuse of drugs and antibiotic agents that are useful when properly prescribed is not new to any of us, *e.g.*, calcium gluconate, since calcium therapy was proved to be specific for correctly diagnosed parturient paresis, and the abuse of the sulfonamide drugs. First, sulfanilamide was used for almost everything, even though many of its contraindications and limitations were known. There have been many case reports of toxic effects from its improper use. Some of the later sulfonamide drugs are also being misused. In the last five years, these drugs have been completely catalogued as to use, dosage, and toxic manifestations. The specificity associated with each demonstrates the fact that they, for safety reasons if no other, should not be used except by, or on the specific advice of, a medically trained person.

Penicillin has also been misused in home treatment of human beings and animals. Sulfonamide drugs and penicillin, alone or in combination, have value as udder infusions, but many farmers buy and use too much of both. In some cases, the agents are used when not needed, but what is far more serious is the fact that many persons, in their routine use of the preparations, disregard sanitary procedures in connection with the administration, and neglect the fundamental preventive procedures. Some, who are in a position to know, are of the opinion that there is more mastitis now than ever before in dairy herds, and they trace it to overdependence on treatment and neglect of other practices. It is the natural thing to expect, though, for it is human nature to let up on the little routine details that are so very important as soon as a good treatment or cure is found. Medicines for herd and flock treatment of swine and poultry predominate on the shelves and in the windows of stores, though worm pills and capsules for pets, and cures for mastitis are high on the list.

The average livestock owner is not cognizant of the dangers associated with the improper use of biological products. Many seem to think of vaccination in terms of a syringe, and we've heard veterinarians tell agricultural teachers that they shouldn't be allowed to use syringes. We must get to the root of this matter, talk in the language we should know and not about the mechanics of a syringe, if we are to help correct a bad situation. Improper use of hog-cholera virus and antiserum has led to many breaks. Mistaken diagnosis and use of the wrong products lead to costly sequalae. Anthrax vaccines are dangerous. I know, as we use them, and there are many places where they can not, and should not, be used. There are many examples of anthrax actually being started by owners using spore vaccines. The *Brucella abortus* vaccine is not a stable product. Its continued use by owners, without knowledge of the limitations, is definitely a detriment to a successful program of brucellosis eradication and control.

One way of estimating the amount of biological material sold direct to owners is to quote some figures. In 1948, over 34 per cent of the *Br. abortus* vaccine, 33 per cent of the blackleg bacterin, 27 per cent of the hog-cholera antiserum, 36 per cent of the hemorrhagic septicemia serum, 64 per cent of the hemorrhagic septicemia bacterin, and 50 per cent of mixed bacterin (bovine) were produced by lay companies, *i.e.*, those which sell to both graduate veterinarians and through other channels, or directly to livestock owners.

There are numerous examples of trouble traced to improper use of vaccines in poultry flocks and plants. In connection with the latter, the shoe pinches the veterinarian very tightly. Yes, in general we have left the poultrymen to their own salvation. In many states, it has been expedient to allow poultrymen, on proper permit, to vaccinate their own flocks against such diseases as laryngotracheitis and Newcastle disease, and the poultrymen quite universally do their own fowlpox vaccination. In spite of trouble we know about, I think we must agree that these folk have done a pretty good job.

Where is the trouble? Why do people spend so much needlessly, and often unwisely? There are many contributing factors—I will mention some of them.

1) The layman appears to have a complex toward wanting to treat himself and his animals. Possibly, it is a characteristic to be admired rather than condemned—I mention it as a cold fact. This attitude, plus the American's gullibility for advertisements, furnishes the background for sales of most

medicines and high-priced, complicated, mineral mixtures.

2) Surely, the shortage of veterinarians in many areas, coupled with the need for some of this work, is partly responsible. There are extensive areas in our country, many of which have large numbers of animals (not in concentration), where professional veterinary service is inadequate or entirely lacking. The owners can not be denied practical protection, where needed. Then, too, shortage of veterinarians and lack of interest in poultry cannot deny this industry the protection it is entitled to, and neither can the good hound in the swamp or mountains be deprived of worm treatment. These admissions do not justify, however, much of the activity by laymen in areas where there is efficient and adequate veterinary service.

3) Because there are effective vaccines and other biological products for some diseases, it does not follow that many others are of proved value. Large sums are spent needlessly for some of these drugs. For example, the etiology of pinkeye is not established. The natural course is doubtful, and the farmer beats himself if he uses a pinkeye vaccine. What of mixed bacterins?

4) It appears that we have developed a mania for "shots" to heal all ills, and large sums are spent for products of this type. "Give him a shot, doc." Too many in the medical profession have developed a "vitamin B complex" and give it as a magic cure or in conjunction with almost everything else. If it is so universally valuable, and can be taken as a pill, then why not buy it and take or give it, rather than pay a fee to have it injected? That is exactly the way the public has responded.

5) Lack of appreciation of the value of day-in-and-day-out intelligent, sound practices of animal, dairy, poultry, and canine husbandry is serious. Many owners are negligent of these chores we know to be necessary and, of course, many are not properly informed. Some look for a quick, cheap, easy cure, not realizing, or deliberately forgetting, that prevention is the secret of successful human and veterinary medicine, and that there are thousands of salesmen ready to sell them the "sure stuff."

A glance at the shelves of drug, and some other, stores and at the thousands of advertisements in papers and magazines and over the air is quick proof of how people like to treat themselves, members of their families, their neighbors, and their livestock. The vast sums spent advertising products for self-administration proves that it is lucrative to the producers and the promoters. There are numerous examples of people who believe such claims (often unsubstantiated and grossly erroneous) for products, rather than an open, frank opinion of an authority based on knowledge, reason, and logic. There are ways to make these claims and still evade federal and state laws. This same psychology has been applied to the sale and use of biological products for animals.

Dr. L. Van Es[5] said, "Sanitation is making the surroundings fit and safe for animals to live in." If owners would start here, ask for immunization and anthelmintic treatment when necessary, realize that a fee for advice is often cheaper than one for medicines and surgery, call for assistance when animals are sick, and pay just these costs and no more, it would mean a great saving to the individuals and in the aggregate.

CONTROLS

Reports from several state veterinarians and other regulatory officials show that few states have reasonable control over medicinal products sold direct or through intermediate agencies. Many states have laws similar to the Federal Food, Drug and Cosmetic Act, which require that some specific items can move only on medicinal prescriptions, that products and devices be registered with some state agency, and that they meet certain requirements relative to ingredients (formulas), labeling, dosage, and claims or advertising. There are penalties for misbranding and adulteration, if spot checks find the producer is not conforming; but the machinery, especially finances and personnel, for prosecuting is inadequate. Notices of judgments under the Federal Food, Drug and Cosmetic Act always report many operations designed to "take" the purchasers in one way or another. Large amounts are spent for the many concoctions which meet requirements for shipment, inter- or intrastate, and make no particular or false claims, or do no specific harm, but unfortunately are completely useless because of the extremely low content of active ingredients. No harm, no good—just a needless expenditure of money. A letter from Dr. Edward C. Elliott, president emeritus of Purdue University, presently director of the Pharmaceutical Survey of American Council on Education, states:[3] "Many years of observation have convinced me that here we have evidence of an expensive form of racketeering."

Some states have limited control, some quite effective control over the distribution of biological products, especially live virus and live bacterial immunizing agents. Others have essentially no control. At a meeting not long ago, a big operator asked why *Br. abortus* vaccine could be purchased in his state when it was a product that needed to be protected and properly stored. He had to be reminded of bodies known as legislatures, and groups and individuals known as lobbyists. The sales lobbies are in there pitching, but not enough of those who realize the necessity for restriction of these products as a matter of protection to an ignorant, gullible, purchasing public.

Defining and controlling medicated feeds and minerals always has been a major problem to control officials. The recent research on sulfaquinoxaline has brought to the front an effective and badly needed medicament. The low concentration in

which it is used cannot be satisfactorily obtained except by the large feed dealers who mix the chemical in the feed. It is being allowed in many states now and more will allow it, but the concern is how to keep products of questionable or negative value from being incorporated.

Much is known about the actions of, indications for, limitations, and dangers associated with the use of many drugs, biological products, and antibiotic agents. Only the person with proper training can adequately understand these facts and know when and how to apply them. No owner, farm manager, herdsman, agricultural teacher, feed service man, county agricultural agent, or other layman can do the job satisfactorily. He shouldn't be expected to know it, and he should realize his lack of training in this field. This statement is made without malice, for we all have many friends among this group, but the cold fact is they just do not have the particular "know-how."

In this connection, we must realize that it is our privilege to work with, and for, some very intelligent, and many times well-educated, owners and clients whose deep concern for the general welfare of farm animals, birds, and pets is just as sincere as ours, though at times their actions aren't in the right direction. We must be fair in our presentation, and realize there are occasions where immunization, first aid, and occasionally specific therapy cannot be denied because we are not there. If we take time, examine the patient or the herd or flock, make a differential diagnosis, explain our procedures and reasons for certain therapy or a course of treatment, then seldom will this owner turn to quack products.

Sound information and advice must be given regarding vaccinal procedures relative to certain diseases. This approach impresses the top notch man, and he serves as our front man for the benefit of all. Agencies working with farmers realize the value of group meetings and the advantages gained by a carefully planned program. Surely, such an approach is one way for us to show our genuine desire to educate and help cut down on these hidden costs which are actually needless. Educating the public is a peculiar and specialized business—slow at best, particularly when trying to protect and assist, rather than sell something.

THE VETERINARIAN'S PART

We, the veterinarians of the United States and Canada, as a group of professional men, owe our success jointly to the profession and to the livestock owners who support us and who we, in turn, support. There are areas of disagreement between us at times, but we are one team and each must help the other as we are interdependent groups. As the guardians of the health of a multibillion dollar livestock and poultry business, and hundreds of thousands of pets, we are interested in helping the owners reduce these generally unobserved costs, and we are conscientiously opposed to the promiscuous sale of disease-producing agents and useless products, and even qualified products without reason for their use. Obviously, 15,000 veterinarians can't completely close the gap. We are pretty thin in numbers but we can do a great deal. In approaching this matter we must not always point a guilty finger at the other fellow. Our accomplishments are considerable and we will improve, but in making these evaluations, criticisms, and suggestions, we must remember there is always a little "picking up and cleaning up" to be done in our own yard while helping our neighbor clean up his yard. We can not, and should not, condone the actions of some men who carry the D.V.M. after their names.

We must face the facts and make a positive approach to this whole matter. The veterinarian's part is to render professional service and advice and to show owners that this phase of veterinary medicine, *i.e.*, animal disease control and therapy, is dependent upon two basic and fundamental facts: (1) Prevention means planning and is based upon sound husbandry practices, accompanied by the applications of biological products and therapeutic and anthelmintic agents where and when necessary; (2) thorough examination and correct diagnosis are essential, fundamental features of successful curative and preventive medicine.

As we increase in number and do a better job of educating livestock producers and owners about the benefits our profession has given and continues to offer, more people will see the fallacy of some of their practices. Personalities, their contacts and influence, are more valuable in a given community than any other approach. In short, this means the individual veterinarian must participate in many activities in the community, as well as do a good job as a veterinarian. Many a veterinarian is doing commendable service which, in the end, accrues to the credit of the profession. Organized veterinary medicine is making some very definite and positive contributions in several different ways toward correcting the ills mentioned. Some of them are: the activities of the local, regional, and state veterinary medical associations and of the AVMA and the American Animal Hospital Association through their various committees, particularly public relations. Many of the veterinary supply houses are doing an excellent job along this line, and the activities of the Associated Serum Producers should be mentioned specifically. Many news articles, radio scripts, cartoons, and pictures are released by the AVMA and the Associated Serum Producers, designed to warn and advise owners and at the same time sell the value of ethical veterinary service. Some of the large feed manufactur-

ers are to be commended for their approach to this problem. The whole problem boils down to selling animal owners on the value of diagnosis, which is the "secret weapon" of the veterinarian, and impressing upon the public the useless waste of money when buying medicine for which there is no need. Meetings, such as the regional conferences on brucellosis during the last two years, in which veterinarians, physicians, livestock owners, and many others interested in the economy of livestock production participated, have been very worthwhile. Dr. W. A. Hagan's talk[2] before the National Association of County Agricultural Agents in Chicago in December, 1947, and the meeting[3] called by the AVMA Committee on Public Relations of representatives of veterinary medicine and agricultural education held in Kansas City in October, 1948, have both had a healthy influence toward correcting some of the misdirected activities of these two groups, and the misunderstanding between these groups and the veterinary profession.

One very positive way we may be able to more effectively impress the layman with these hidden costs — self-incurred — is by showing the value of veterinary service in terms of animals cured, days of work saved, reduction in loss of milk, and other measurable gains resulting from proper veterinary care and translated into dollars.

A few years ago, Dr. I. D. Wilson[10] of Blacksburg, Va., worked with some practitioners on a plan to measure such results. Since money value in the form of production units is not easily measured on pets, these men made their calculations only on farm animals which represented, roughly, two thirds of the entire practice. The figures showed that the average cases handled made the services of each veterinarian worth about $30,000 per year. Present values of farm animals would increase this by 30 to 35 per cent. (The method of figuring debits and credits was a conservative one.) Add to this figure outbreaks of contagious diseases that often are stopped or prevented, and a fair figure for pets, and this value goes up rapidly. Yes, the veterinarian is an important, useful, and valuable person in our society.

Perhaps I am bold, but I would like to make a proposal. Last year, veterinary medicine was first organized as a branch of the Association of Land-Grant Colleges and Universities. Veterinary research receives only a small amount of support compared with that put into production programs, since money saved doesn't make as good talk as pounds gained or pounds produced, though it may actually be much more significant. I would like to urge our representatives in the Association of Land-Grant Colleges to make concerted efforts for support of studies similar to those of Dr. Wilson and his coworkers. Those participating in the studies would be practitioners, experiment station veterinarians, and agricultural economists. From such studies could come revealing factual information of value to the livestock industry and to the veterinary medical profession, which will do much to correct the ills mentioned.

CONCLUSION

I have attempted to present some features of this problem, not the answers, and to point out that we are making efforts to rectify a situation which we know needs to be corrected. I am grateful to the many state veterinarians and other regulatory officials and others who so generously submitted factual material, case reports, and additional materials upon which this general presentation was based.

References

Eighty-five personal letters from state veterinarians, other state regulatory officials and others, were received and studied.

[1] Elliott, Edward C., American Council on Education, Washington, D. C., Personal communication.

[2] Hagan, W. A.: The County Agent and the Practicing Veterinarian, J.A.V.M.A., *112*, (1948): 95-98.

[3] Herl, O. E., U. S. Bureau of Animal Industry, Washington, D. C., Personal communication.

[4] Moskey, H. E.: Veterinary Medical Preparations Under the Federal Food, Drug and Cosmetic Act, Food Drug Cosmetic Law Quarterly, (Sept. 1948): 398-407.

[5] Notices of Judgment Under the Federal Food, Drug and Cosmetic Act, "Drugs and Devices," Federal Food and Drug Administration, Federal Security Agency, all numbers 1948 and through April, 1949.

[6] Public Relations Committee of the American Veterinary Medical Association: AVMA—Vocational Agricultural Conference. J.A.V.M.A., *114*, (1949): 43-44.

[7] Service and Regulatory Announcements, Bureau of Animal Industry, U.S. Department of Agriculture, all numbers of 1948 and through April, 1949.

[8] United States Department of Agriculture: Agricultural Statistics, 1947.

[9] Van Es, Leunis: The Principles of Animal Hygiene and Preventive Medicine, Introduction. John Wiley and Sons, 1932.

[10] Wilson, Dr. I. D., Virginia Polytechnic Institute, Blacksburg, Va. Personal communication.

Intrauterine Infection with Anaplasmosis.—Government veterinary laboratory workers in Israel report the death of a 5-day-old calf due to anaplasmosis contracted *in utero* (*Refuah Vet.*, July, 1949). Assumption that the calf was infected prenatally was based on the fact that ten days is the reported minimum period of incubation for this disease. Paradoxically, clinical and microspic examinations of the dam revealed no evidence of *Anaplasma marginale* infection.

Two-Way Radio in Veterinary Practice

R. E. RASMUSSEN, D.V.M.

Bloomfield, Iowa

MANY of the uses and advantages of direct car-to-office communication are evident. To list just a few, one might mention the quicker availability for emergency calls, directing of office prescriptions, and making of appointments. It might enable the veterinarian to collect old accounts by having immediate access to office records, to inform clients of unexpected delays, to group calls better, and to make appointments for "stop" calls while in that vicinity. Last, but not least, it is extremely handy to summon aid in the event of road emergencies, such as mud, collisions, and motor trouble.

Fig. 1—Mrs. Rasmussen at main station transmitter.

Two-way radio equipment is produced by many different companies, *i.e.*, Motorola, General Electric, Harvey Radio, Bendix, Link, and Western Electric. Most of this equipment is frequency modulated, compact, and rugged.

Very high frequency waves have some definite characteristics which limit its use in specific instances. These waves travel by line-of-sight. Because of this, range is determined primarily by the height of the antenna and the physical character of the earth's surface. With the moderate antenna that can be supported without guy wires, range will probably approximate 15 to 20 mi. in relatively flat country. At certain points, this can be exceeded but in low places within this area reception may be extremely poor.

FM radio waves are relatively unaffected by atmospheric conditions. Even during electrical storms, the signal received is remarkably clear and free from static.

Very high frequency equipment is extremely sensitive. For this reason, tuning and servicing must be done by a skilled technician. In rural areas, this is a problem which can cause no little disturbance to the operator. Most of the trouble in the units can be eliminated by routine servicing and replacing of weak tubes.

The greatest disadvantage is the cost. This varies with the make, the size and the power of the units, and the type of antenna installation required. The cost will probably range from $1,500 to $2,500 for serviceable equipment made by a reliable company. Most manufacturers employ field

Fig. 2—Dr. Rasmussen operating mobile hand set.

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engineers who will determine what type of equipment will be best suited to a locality and will make recommendations for each installation. They are also able to assist in completing the necessary applications to the Federal Communications Commission.

If the application is approved, it will probably take about six weeks before a frequency is assigned. Then, the manufacturer must grind the crystals to the frequency, which will take about another month.

Fig. 3 — Mobile transmitter and receiver in trunk of car showing one pandora bag in luggage space.

The Federal Communications Commission revised its rules concerning land mobile services, effective July 1, 1949. Under the new rules, the 152-162 megacycle band will be shared by domestic public, public safety, industrial, and land transportation services. The public safety services include the police, fire, forestry-conservation, highway maintenance, and special emergency radio services. Special emergency radio service authorizations include, among others, "Physicians normally practicing in remote areas where other communication facilities are not available."

Two-way radio is, without question, a convenience which saves time and driving and enables a veterinarian to perform quicker service for his clients. The initial cost is rather high so it would not be practicable in every instance. However, in a busy practice, where time is an important factor and where there is much driving to do, this type of equipment is a worthwhile investment.

An idea or a practice can not be subdued by argument or derogatory remarks — but only by substituting something better.—*W. J. Gibbons, D.V.M., Alabama.*

Dr. Simms Reports on Foot-and-Mouth Disease

"We think we have a good chance to win the battle against foot-and-mouth disease in Mexico."

This heartening news came from Dr. B. T. Simms, chief of the U. S. Bureau of Animal Industry, in an address before the American Farm Bureau Federation in Chicago, Dec. 12, 1949. Dr. Simms added, however, that nobody knows how long it will take to do the job and that successful completion may hinge on certain uncontrollable factors.

For example, there is a human element to be considered: Outbreaks may be overlooked by inspection teams. Moreover, neither the vaccine nor the vaccination is perfect; the current belief is that immunization affords protection for about four or five months. Another hazard is the ability of the virus to survive for six to twelve months outside the animal body.

Regarding the possibility that the disease may invade United States herds, Dr. Simms cautioned that air transportation makes this country more vulnerable than ever to the virus. He pointed out that foot-and-mouth disease exists on all continents of the world except Australia, and that the danger of importing infection from Europe and elsewhere is as great as from Mexico. One reassuring note was that of the six United States outbreaks since 1900, not one was due to the importation of large animals.

Preliminary tabulations, reported by other official sources, show that the eradication forces wound up the year of 1949 with a total score of over 36 million vaccinations, accomplished with the aid of mule teams, saddle horses, jeeps, boats, and planes—often over rugged terrain, some of which had never before been crossed by white men.

Why the Rapid Herd Turnover?

Losses from dairy herds, or herd turnover, is known to be rapid. The average productive life in herds enrolled in DHIA testing has been shown to be four or five years. A report (Mich. Agric. Exper. Sta. Bull., *31*, (No. 3): 351-353) analyzes the causes for this rapid turnover in seven herds including 438 cattle. Disease, as might be expected, accounts for a sizeable percentage—mastitis 11.4 per cent, breeding troubles 10.5 per cent, and brucellosis and abortion 1.8 per cent. The highest single factor is low production, 15.1 per cent. To what extent disease may have contributed to low production is not explained.

Twenty-Five Years of Poultry Practice

F. C. TUCKER, M.D.V.

Claypool, Indiana

NO AGRICULTURAL industry has experienced such rapid development and wide distribution of its product in such a short period as has the poultry industry. Today, on more than 85 per cent of the farms, poultry is a partial, if not the chief, source of income.

Kosciusko County, Indiana—where I was born and grew up—claims the highest poultry population of any county west of the Allegheny Mountains, aside from the Petaluma Valley in California.

It was in this county, near Winona Lake, that Leo F. Roettger, then a young bacteriology student who later became professor of bacteriology at Yale University and acquired international recognition, observed and recognized a peculiar disease in a hen-hatched and hen-brooded flock of baby chicks with a mortality of 86 per cent. Possibly at this time, 1900, the first diagnosis of what we know today as pullorum disease was made.

In 1911, the first commercial poultry farm was started in Kosciusko County. Its success was such that soon others were started.

The same laws hold in poultry as elsewhere in nature—the greater the concentration of animals, the greater the disease hazards. Eventually, therefore, disease problems became a large item in the poultry industry.

In the early 1920's, these disease problems began to come to my attention. At first, it seemed odd to examine a sick chicken, but when the size of the flock and the investment was considered, it was readily seen why keeping these diseases at a minimum was economically important.

Controlling pullorum disease became increasingly important, for staggering losses were common. Raising 60 or 75 per cent of the brood of baby chicks was, at that time, considered pretty good.

In 1924, I spent some time at the Purdue University laboratory with Dr. L. P. Doyle, learning the fundamentals and technique of the tube agglutination test—accepted as the most dependable means of identifying the carrier hen, and least subject to error when done by the routine laboratory technician. Even then, it was known that the only way to successfully control pullorum disease was to keep the eggs from carrier hens out of the incubators.

Custom hatching, a common practice among hatcherymen at this time, was difficult to discourage. I started out by running my own tube agglutination test and have always stayed with this plan.

Many other angles of poultry practice and disease control presented themselves and, appreciating my inability to render the best type of service, I enrolled in a southern state university and spent six weeks with a poultry pathologist. The knowledge acquired enabled me to recognize many things previously overlooked.

Chickens are autopsied every day at a charge of $1.50. This procedure has been followed for many years to my clients' satisfaction.

Hatcherymen send flock owners and baby-chick customers to me with disease problems, preferring to pay for a diagnosis rather than have diseased birds brought to their own farms. Or, in many instances, they request that I visit the farms. Poultry practice is no different from any other type of practice. The very first fundamental, of course, is to gain the client's confidence—without confidence little can be accomplished.

We must possess sufficient knowledge to talk intelligently and convincingly with our clients in their language, and in terms that they can understand. It is difficult to converse with poultrymen if one is unable to recognize the more common breeds. Much benefit and current information is obtained in reading poultry literature. Every interested veterinarian should subscribe to the leading poultry magazines. It helps, also, to associate with the poultrymen at their local gatherings and state and national conventions when possible.

I recall the first AVMA poultry section I attended. It was here in Detroit at the Book-Cadillac Hotel, in 1929. There was but a small handful in comparison with the attendance last year in San Francisco, where the room was inadequate to accommodate the group interested in poultry diseases.

Certain poultry diseases are transmissible to man—for instance, erysipelas in turkeys. In 1947, a man with 4,500 turkeys presented some of his birds with the history of losing a few toms; none of the hens were dying. I

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performed postmortem examinations on 5 toms bare-handed, and made the diagnosis of erysipelas. The next day, I had what seemed to be a small splinter in one of my fingers. Unable to find any splinter, the possibility of infection from a bad dystocia case suggested itself. After two or three days of treatment, when no improvement was noted, erysipelas was suspected. Fresh erysipelas antiserum treatment proving ineffective, I consulted a doctor who said my diagnosis had been correct and, as gently as possible, impressed upon me the seriousness of erysipelas. Penicillin in 100,000 and 300,000 units was injected, and in about forty-eight hours, all traces of erysipelas had vanished.

Three or four years ago, I experimented with tenderizing pellets, sex hormones, or diethylstilbestrol. In young cockerels, 15 mg. were injected subcutaneously at the base of the comb in 5-month-old Leghorn-Minorca cross birds, and produced good results. In four or five days, the bright red in the combs began to fade; in ten days, a decided change in mannerisms was noted; in three weeks, the combs had shrunk considerably, and the owner said one rooster would cluck and squat like a hen when approached.

At about this same time, some old White Rock cockerels were injected after they had been in the breeding pen for a year. In these, 30 mg. of the hormones were injected at the base of the comb. In a week, the bright red began to fade rapidly, and the birds were less active. In two weeks, the mannerisms had changed completely. The crowing and strutting around hens was conspicuously absent. The birds became awkward and slow and they gained about 1 lb. in a month. I had the pleasure of eating some of these birds and their meat was really tender and delicious.

It is important to remember, when injecting birds with sex hormones, that the treated birds should always be separated from the untreated, as the treated birds soon lose the disposition to fight. The injection should be made about a month before slaughter; later, a regeneration of the testicles may occur.

There is great personal satisfaction in pioneering in this type of veterinary service. What I have accomplished is within the reach of most veterinarians. The highly developed and widely distributed poultry industry brings most practicing veterinarians face to face with many of the poultrymen's disease problems and an opportunity to render a service that is deeply appreciated.

A short time ago, I autopsied some hens and made the diagnosis of visceral leucosis. The owner told me her veterinarian had also found large livers on some of the same birds on postmortem, which he said were caused by feeding a too high level of protein in the laying mash. It should never be below our professional dignity to tell our clients when we don't know what is wrong. It is much better for us to tell them we don't know, when we don't, than for them to find it out from other sources after we have bungled things. Bluffing only creates disrespect and it reflects with discredit upon the veterinary medical profession.

We must not overlook the need to be in position to give our clients up-to-date, scientific information on disease control and prevention in all livestock and poultry.

Because of the prosperity of the poultry industry, it is my belief that a grand opportunity awaits the scientifically trained, ambitious, graduate veterinarian in poultry practice.

DISCUSSION

DR. R. A. MERRILL (Clara City, Minn.): Have you used stilbestrol in turkey toms?

DR. TUCKER: Last week, a man from Nevada sent me a night letter asking what I would recommend for turkeys, and this is what I wrote him: I would inject 30 mg. on the top of the head, or any place where the tissue would be thrown away when the bird is slaughtered. This should be done about a month before the birds are marketed.

DR. MERRILL: Have you used it?

DR. TUCKER: I have never used it. I don't know why it should not work. The cocks I used were old ones that had long spurs, and it worked on them.

Summer Influenza

We have been seeing what apparently is true swine influenza during the summer months. However, the death losses have been as high as 15 to 20 per cent. There is an acute pneumonia, acute edema of the lungs, and a solidification of the lungs resembling the lungs of calves affected with shipping fever. There is also an organized exudate on the ventral surface of the lungs and in the peritoneal cavity. The affected pigs show exaggerated respiratory distress. Penicillin has shown some promise as a treatment.—*J. D. Ray, D.V.M., Omaha, Nebraska.*

Eggs produced by birds infected with avian pneumoencephalitis (Newcastle disease) are of low quality and do not keep well in storage. They are smaller, many are odd-shaped, the shells are thin and sandpapery, and the albumin is watery, according to E. D. Parnell, M. S., Texas A. & M. College.

SURGERY & OBSTETRICS
AND PROBLEMS OF BREEDING

A Comparison of Surgical Procedures in Reducing Umbilical Hernias in Swine

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THE SURGICAL repair of reducible umbilical hernias in swine warrants considerable study from the standpoint of development of a practical and successful method that may be applied in the field. It is common knowledge to those who have performed this operation that, although the standard and accepted principles of good surgery are followed, the condition frequently recurs. This is particularly true with swine, while in other animals the same surgical practices usually result in success.

Various factors may account for the difference between success and failure. One of the principal reasons for failures is the anatomic factor of an apparent weakness of the ventral abdominal wall in the region of the umbilicus in young pigs. Insufficient supporting tissue tends to allow future herniation as a sequel of the operation, in spite of the type of reduction performed. Frequently, the original hernial ring will hold, but a new hernia develops along the line where sutures pass through the abdominal wall.

In general practice, this condition is seen frequently, and it is necessary that some simple, but successful, method be used. If this is accomplished, it is an excellent practice builder. The author has performed this particular operation by practically all the various techniques ever used or described.

The principal object is to completely reduce the hernia and to close the ring in such a manner that there will be no recurrence of the condition. Briefly, there are two surgical methods whereby hernias may be reduced. The first one is accomplished by removing the entire hernial sac; while, in the second, none of it is removed but it is inverted through the ring into the abdominal cavity before the edges of the ring are brought into apposition.

This discussion will give a comparison of the results of the various methods by which umbilical hernias in pigs may be reduced, and only very slight reference will be made to the actual details of preoperative preparation, asepsis, and anesthesia. Various points of differentiation, however, will be mentioned as a matter of comparison.

We all know the importance of careful surgical procedures and measures that must be employed before, during, and after any operation. Any statements indicating a variation from these thoughts do not suggest that slip-shod methods are preferable or even adequate. They merely indicate that a simple, practical method of farm surgery can be successful, and is preferred over the fine, detailed surgical technique that can be used only under the controlled conditions of a hospital.

PREOPERATIVE PREPARATION

In regard to preoperative preparation such as clipping or shaving the area, only a very few bristles are found and these may be clipped with scissors. Ordinary washing of the operative area with soap and water is sufficient. Then the area is dried and some commercial type of skin sterilizing solution or alcohol applied.

Epidural block or field block seems to be the most satisfactory anesthesia, especially the latter. In the field block, the patient is able to stand immediately after release, and there is less danger of injury than with the patient that drags itself around after an epidural block. With either of these methods, any of the usual types of local anesthetics are satisfactory. In most of the operations, a 1 to 2½ per cent solution of procaine hydrochloride was used.

During the many years here reviewed, a considerable number of operations were per-

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formed under aseptic conditions to determine if healing by primary union had any decided advantage over postoperative infected areas where healing was somewhat delayed. Where postoperation contamination was allowed to occur, the operations were performed under ordinary conditions of cleanliness, but strict aseptic procedures were not practiced. End results were as satisfactory where ordinary precautions were taken as when aseptic measures were followed.

A practical approach must be made, and it is impossible under ordinary farm conditions to prevent contamination of operative wounds because of the nature of our patients and their environment.

Whatever procedure is selected there are other factors to consider, such as the type of suture to be employed in closing the hernial ring. Generally speaking, a nonabsorbable suture was the most satisfactory, as it induced more local tissue reaction and, thus, more connective or scar tissue was laid down to support the area. Linen and braided silk were used almost exclusively, chromic catgut occasionally, and stainless steel not at all.

SURGICAL REDUCTION

Depending upon the size of the sac and ring, either a linear skin incision was employed, or two incisions were made which would isolate an elliptical island of skin. Always, the incisions were directly over the ring. Blunt dissection was used to separate the sac to the ring. When the sac was removed, it was cut at the very edges of the ring. The removal of the sac at this point produced the raw edges of the ring which were then brought into apposition by the use of interrupted sutures. In many cases, this method was successful; however, herniation followed occasionally at the point where the suture went through the abdominal wall.

The mattress suture was employed more successfully, forming an under and over flap. This suture causes the edge and a small adjacent area of one side of the ring to overlap the opposite side. This results in a firmer union, as more area is provided for adhesions. After placing the mattress suture, bring the edges of the upper flap to the abdominal wall, especially if a large ring is present.

Probably the most practical method for ordinary farm surgery is a clamp placed over the sac and as close to the ring as possible. This clamp must be tight enough to interfere with the circulation and to cause sloughing in a week or ten days. Regular, surgical hernial clamps or home-made ones work equally well. A 6 to 8 in. piece of fork handle sawed down the middle and with holes drilled near the ends has been very satisfactory in the hands of one of our herdsmen. Bolts are inserted through these holes and tightened down with nuts. In our experience, no new herniations have occurred after its use. The secret, we believe, is that it causes the large granulating area so vital in producing scar tissue for the extra support needed.

A more elaborate technique employs, under a regular hernia clamp, either a cobbler's stitch, using a needle on each end of the suture to make a continuous figure eight, or a series of overlapping square knots. In each case, the clamp is removed after the sutures are completed. This procedure offers no advantage over the wooden clamp method. The chief objection to the clamp procedure is that it looks so simple the owner sees no reason why he could not do it himself. A point in favor of the suture procedure is that sometimes the clamp fails to come back after sloughing has occurred.

The second method mentioned in an earlier part of this paper, *i.e.*, where the hernial sac is not removed, is also successful. The abdominal wall should be undermined for a short distance around the circumference of the ring, after exposing the sac by blunt dissection. This procedure makes sufficient tissue available so that the under flap and over flap can be fixed with the mattress suture.

As stated, aseptic reduction was tried, on an experimental basis, and in some cases no better end results were obtained than when ordinary precautions were taken. The routine procedure in many cases was to place 1 or 2 interrupted or mattress sutures in the dependent skin flaps. This was done mainly for the purpose of holding a gauze pack in place for about twenty-four hours, after which the sutures and pack were removed. Seldom was any more after-care given. In an equal number of cases, a mild astringent dusting powder was liberally sprinkled into the wound immediately after the ring was closed by suturing. Following this, no more after-care was given and they did equally as well.

DISCUSSION AND RESULTS

After many operations for reducible hernias in swine over a number of years, the main conclusion reached was that the simpler the operation, the more successful is the outcome. It was pointed out previously, and should be emphasized again, that good surgical principles should never be belittled in doing farm surgery on swine. One is always correct in using proper sur-

gical methods, but under conditions on the average hog farm, one must take into consideration the patient, the environment, and the market value, and then adopt procedures that are simple, practical, and above all successful. Generally speaking, results were more satisfactory where the hernial sac was removed either by the clamp or by suturing, than where it was left and inverted into the abdominal cavity.

SUMMARY

The reduction of umbilical hernias in young swine can be satisfactorily accomplished by observing these general principles: Respect general cleanliness, although strict asepsis is not necessary; use a satisfactory form of epidural or field block anesthesia; employ complete reduction and proper fixation of the hernial ring; allow healing to proceed as an open wound; provide clean quarters, if possible, for at least several days or until a good covering with scar tissue has started; render no particular after-care in most cases.

The operation for the reduction of reducible umbilical hernias in young swine can be a simple, yet practical, procedure that can be done by any veterinarian. It takes very little material and only a few instruments. It is an operation that is neglected and should be done much more frequently than it is. In the end, it will pay much larger dividends than the actual fee collected for the operation.

Antibody Reaction to Trichomonas Foetus

Kerr, McGirr, and Robinson (*J. Comp. Pathol. and Therap.*, Apr., 1949: 133-154) confirmed prior work to the effect that a serum titer develops in newborn calves shortly after consuming the colostrum of dams infected with or vaccinated against *Trichomonas foetus*, and that the dam responds likewise to the localized infection of her vagina. The presence of antibodies was detectable in the calf's serum by means of the intradermal test four to fifteen hours after ingesting 3 pints of high titer colostrum. The distribution of the antibodies throughout the calf's skin was shown by the pronounced intradermal reaction—transient edema and formation of a bleb at the site of injection.

Although titrations established the layers of the skin as the site of the antibodies, the blood and lymph could not be entirely excluded. Transplacental passage of Trichomonas antigens was excluded by their absence in the calf's body before ingesting colostrum. The colostrum-produced immunity seemed to have lasted at least thirteen months. Obviously, the duration corresponded to the passive antibody strength of the colostrum fed. Besides these significant findings, this study reconfirms that trichomoniasis of cows is not a mere local interruption of reproduction but, from the clinical point of view, a generalized malady characterized by the absorption of trichomonad débris.

Conjunctival Flap Operation for Treatment of Perforated Corneal Ulcer

A 10-year-old Springer Spaniel was presented at the hospital on Sept. 1, 1949, with a corneal ulcer of the left eye about 3 mm. below the limbus. Sterile milk, 2.0 cc., was injected. Treatment prescribed was: atropine sulfate (1%), 1 drop morning, noon, and night; sodium sulfacetimide (30%), 1 drop every three hours. The owner was advised to return the animal weekly.

The dog was not returned until October 28, almost two months later. Examination revealed the ulcer perforated, the aqueous humor escaping, severe ciliary injection evident. At this time, we decided to make a conjunctival flap, hoping by this means to allow the ulcer to heal.

The animal was surgically anesthetized with sodium pentobarbital. The upper conjunctiva was freed and sutured to the membrana nictitans with 000 chromic catgut. The edges of the eyelids were kept in approximation with strips of adhesive tape, and the eye was bandaged. Subsequent treatment consisted of daily subcutaneous injections of 2.0 cc. of sterile milk. The sutures were absorbed in eight days, at which time examination revealed the ulcer considerably healed, the corneal opacity greatly decreased. The dog was sent home November 12, and sodium sulfacetimide was prescribed, 1 drop every three hours. The owner was told to return the animal weekly for examination.

We realize that animals are expendable, but our first aim should be to save the eye. Although enucleation would have been suggested after the ulcer had perforated, we found this method of treatment to be excellent.—*Alan A. Livingston, D.V.M., Long Island City, N. Y.*

The main advantages of fracture fixation with intramedullary pins are: tolerance of the animals to the pins, short healing time, and satisfactory function of the limb during the healing period.—*W. O. Brinker, D.V.M., Michigan.*

CLINICAL DATA

Clinical Notes

Blackhead losses are likely to be highest among poults under 12 weeks of age.—*C. D. Lee, D.V.M., Iowa.*

The greater the capacity of a dairy cow for high, sustained milk flow, the greater the need for body-cooling assistance from fresh water in hot weather.—*USDA.*

Tests by Macht and Farkas on rabbits, cats, and human patients showed that aureomycin (given orally) shortened coagulation time, as do penicillin and streptomycin. —*Science, Sept.* 23, 1949.

Living, modified, and dead avian pneumoencephalitis (Newcastle disease) virus vaccines are available, and the veterinarian must select the correct one upon the basis of conditions existing in the flock where the vaccine is to be used.—*H. E. Moses, D.V.M., Indiana.*

An egg test is reported by the University of Illinois to be 97 per cent accurate, compared with the blood test, in detecting the presence of avian pneumoencephalitis (Newcastle disease) in a flock. It also is used to determine whether vaccination of laying flocks was effective and to help hatcherymen screen out previously infected breeding flocks.

Report on Neomycin

Neomycin, one of the newer antibiotics, appears to have promise in combating mycobacterial infection (*Am. Rev. Tuberc.*, 60, (July 1949):78-89). Neomycin was shown to be more active against pathogenic and saprophytic mycobacteria than other antibiotics and was just as active against streptomycin-sensitive as streptomycin-resistant strains. Moreover, mycobacteria do not develop resistance against neomycin as rapidly as against streptomycin. Although the *in vivo* studies in experimental animals are insufficient to justify broad conclusions, neomycin appears to be highly effective against the ordinary pathogenic gram-negative and gram-positive bacteria. The activity dose is only 1/20 to 1/50 of the toxic dose.

When a hog looks greasy and gives off an offensive odor, be on the lookout for a *suipestifer* infection.

When fox encephalitis infects the dog, chorea may be the primary or even the only symptom recognized.—*H. W. Hayes, D.V.M., Tennessee.*

Brucella organisms seem to be attracted to certain fixed tissue cells. It has been suggested that this may involve a catalase-enzyme reaction.—*I. F. Huddleson, D.V.M., Michigan.*

When heat lamps were installed in lamb brooders, it was learned that lambs spent a great deal of time under the lamps, especially during cold days and nights.—*Frank Thorp, Jr., D.V.M., Michigan.*

Studies in rumen digestion show that a large part of the ingested carbohydrate is converted to the lower fatty acids in the rumen and that little glucose as such is absorbed.—*L. W. Holm, D.V.M., Wisconsin.*

Viruses usually perpetuate themselves by serial transfer from sick to well animals, and they multiply only in living cells. How, then, are they preserved from one outbreak to the next?—*R. E. Shope, Ph.D., New Jersey.*

Brucella M vaccine (Huddleson) is a candidate for the replacement of strain 19 of the U. S. BAI. Although large-scale trials have given promising results in Michigan and other places where permission to test its merits was granted, its release for general use is still in the offing.

The sublingual vein in the dog is an excellent site for emergency intravenous injection. In an anesthetized dog, the tongue is pulled out and up against the molar teeth thereby compressing the vein. The vein is easily seen and very quickly entered with a 23-gauge needle.—*R.B. Koger, D.V.M., Missouri.*

Leptospirosis in Cattle

RALPH B. LITTLE, V.M.D., and JAMES A. BAKER, Ph.D., D.V.M.

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IN 1948, Baker and Little[1] reported their study of an outbreak of bovine leptospirosis in a New Jersey dairy herd in 1946. Since then, extended observations on this herd, studies on other herds, and information reported by others have shown leptospiras* to be important agents in causing disease of cattle. Furthermore, there are found in the literature descriptions of clinical conditions of undetermined cause, principally hemoglobinurias, which suggest that leptospirosis may be even more widespread. Now that sufficient basic information has been accumulated by experimental procedure to provide accurate diagnosis and to apply preventive measures, it is felt worthwhile to present these findings, especially since the signs of illness may be so variable that, unless the practitioner is fully aware of the symptomatology, many outbreaks will be missed.

SYMPTOMS

In New Jersey, most outbreaks were observed from May to early November, although sporadic cases occurred at other times. Mild disease characterized by fever, albuminuria, and, in the case of lactating cows, bloody or thickened milk, was seen oftener, but occasional animals were severely affected and showed hemoglobinuria. Although both degrees of host reaction to a single strain of Leptospira were produced experimentally, it is considered helpful in presenting the clinical descriptions to discuss the mild and the severe forms separately.

Severe Form.—Usually, the severe form of infection is fatal within two to ten days. The onset is sudden or preceded by a day of inappetence and a drop in milk yield. During the acute phase, there are fever, depression, anorexia, dyspnea, and a marked reduction in milk yield. The temperature may vary from 103 to 107 F., and fever persists throughout the illness. In a day or so, the visible mucous membranes become pale and icteric (yellow or orange). The milk from all quarters is bloody, with a pink, red, or brownish tinge, occasionally containing flecks of blood. The udder is soft and pliable, suggesting little, if any, irritation to the secretory tissue. This limp udder, resembling the gland of a dry cow, is of diagnostic significance. Hemoglobinuria is usually present, the color of the urine being bright red or dark brown. Pregnant animals are quite likely to abort early or during convalescence, and usually the placenta is expelled with the fetus. Before death, the symptoms become aggravated. In addition to prostration, the pulse and respiration are increased, the urine is bright red, and the feces are occasionally yellow. If severely affected cattle recover, the convalescence is prolonged due to continued fever, weakness, anemia, and nephritis.

Mild Form.—The mild form is a similar, but less severe, infection, rarely fatal, and lasting for two to four days. There may be depression, anorexia, dyspnea, abortion, and drop in milk yield; or the animal may appear normal except for a lowered production and a change in the character of the milk and urine. A fever of 102 to 105 F. persists for two to three days. The milk may be bloody, but it is more commonly thick, yellowish, and viscid. Blood in the milk may be detected only at the end of the milking, it may be seen at only a single milking, or it may persist for two or more days. Occasionally, the foremilk is bloody and the later milk is viscid and yellowish. The mammary gland is always soft and limp. Abortions do not occur as frequently as in the severe disease. Hemoglobinuria may occur early or as the cow recovers, and, invariably, the urine is dark brown.

In some cows, steers, and bulls, the rise

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*The classification of organisms with spirals is most uncertain and confused. In the last edition of Bergey's Manual of Determinative Bacteriology (The Williams & Wilkins Co., Baltimore, 6th ed., (1948): 1051), they are all grouped under the order Spirochaetales, which is divided into two families, Spirochaetaceae and Treponemataceae. The former includes forms with many spirals and some internal structures, while the latter includes shorter forms with fewer spirals that are more tightly coiled. The aërobic forms in the latter family are in the genus Leptospira, and, therefore, the organisms that we are describing fall into this genus. The term "spirochete" is a more general one and is used for many of the forms in both families.

in temperature and the hemoglobinuria are the only clinical signs of the infection observed. Occasionally, a mild case may die, and animals with hemoglobinuria may not fully recover for weeks.

In 1946, we had an opportunity to study a mild outbreak of leptospirosis in a mixed dairy herd in New Jersey,[1,2] in which 105 cows had a bloody or a thick viscid secretion (58 and 47 cases, respectively) during a period of thirty-seven days. It is particularly significant that none of the affected cows died, aborted, or were icteric, and only 8 of the 105 animals had hemoglobinuria. The outstanding signs were fever, mild depression, and anorexia associated with a bloody or thick viscid secretion from a limp udder. Later, it was shown by the serologic examination of the blood that from 10 to 20 per cent of the cattle in some groups of 50 animals tested had inapparent infections not recognized by the veterinarian or the attendants, even though strict routine control measures were instituted in the herd to prevent the spread of the disease. After the outbreak had subsided in 1946, a few sporadic cases occurred in 1947, 1948, and early in 1949. Leptospira isolated each year from certain cases showed that the same antigenic strain was the etiologic agent. Furthermore, bloody milk was a more constant symptom of the infection than hemoglobinuria or a thick viscid secretion from the udder.

NOTES ON INDIVIDUAL CASES

The following protocols of 3 natural cases of the disease in the cow not only portray the symptoms and course of the infection, but, in addition, present the results of the inoculation of guinea pigs with blood, milk, or urine.

Case 1.—A Guernsey cow calved for the fourth time on May 6, 1946. On Dec. 2, 1946, the animal showed the following symptoms: temperature 104.8 F., depression, anorexia, bloody milk from all quarters, udder soft and pliable. On December 3, her temperature was 103.8 F. and she showed inappetence, depression, drop in milk yield, and pinkish secretion. Samples of blood, milk, and urine were inoculated into 6 guinea pigs (blood —; milk +; urine —). On December 4, her temperature was 101.8 F., and her condition was the same: still depressed, milk pinkish, udder limp and flabby. Four guinea pigs were inoculated with milk and urine (milk +; urine —). On December 5, the temperature was 101.8 F., there was no improvement in condition, and six guinea pigs were again inoculated with blood, milk, and urine (blood —; milk —; urine —). The animal was isolated until December 23. During this period, the milk was abnormal (bloody or faintly tinged with blood) for fifteen days. The cow returned to production on December 25, and successfully completed the remainder of the lactation.

The milk of this cow was infective for guinea pigs on the first and second day of illness, while samples of blood and urine were negative. Blood drawn from this animal for serologic examination on December 3 was negative; whereas, a second sample obtained after recovery both agglutinated and lysed suspensions of the spirochete in high dilutions. The strain has been maintained in guinea pigs on serial passages, and a pure culture of the spirochete was isolated from the blood of guinea pigs.

Case 2.—A Holstein-Friesian cow, in milk when purchased in April, 1947, on Nov. 18, 1947, showed depression and inappetence. On November 19, the temperature was 106.5 F., and milk from all quarters was thick and viscid. The udder was soft and limp. Two guinea pigs were inoculated with blood and milk (blood +; milk +). On November 20, the temperature was 102.8 F., the cow appeared brighter, and her appetite was good. Small clots of blood were passed in the milk. On November 21, the temperature was 101.6 F., she appeared brighter, and her appetite was improving. The milk was thick and viscid with a faint pinkish tinge due to flakes of blood. She appeared normal on November 22, except that the secretion was thick, viscid, and slightly pinkish. On November 24, the condition of the milk was about the same. At this time, milk and urine were inoculated into guinea pigs (milk —; urine —). Both blood and milk from this cow were infective for guinea pigs on the second day of illness, while the animal was febrile with a temperature of 106 F. On serologic examination, the blood was negative at the onset of the disease, but, after recovery, the serum agglutinated and lysed suspensions of the spirochete in a 1:20,000 dilution. Since November 19, the strain has been carried through 90 continuous passages in guinea pigs. A pure culture of the organism was also isolated from the blood of infected guinea pigs.

Case 3.—The case history of a Guernsey cow purchased in September, 1947, and which calved that same month, follows: November 20—temperature 104 F., slightly depressed, appetite fair, milk from all quarters thick and viscid, udder soft and pliable; November 21—temperature 102 F., brighter, appetite good, milk appeared normal; November 22—returned to production; November 24—temperature 100.6 F.,

hemoglobinuria, milk appeared normal. Two guinea pigs inoculated intraperitoneally with 1 cc. of urine developed a fever, and the disease is now in its ninetieth passage in guinea pigs. A pure culture of the Leptospira has been isolated from the blood of these infected animals.

DIAGNOSIS

A diagnosis of leptospirosis can be made by (1) the inoculation of cattle or laboratory animals with the blood, milk, or urine from cases of the disease; (2) the isolation of the organism in special mediums containing horse or rabbit serum; (3) the microscopic examination of tissue sections stained with silver, or the demonstration of the organism in the blood or tissues under dark-field conditions; and (4) the serologic examination of the blood from recovered cases.

Inoculation of the Natural Host.—In our previous report,[1] we described, in detail, a number of methods for the diagnosis of leptospirosis in cattle. It was shown that the spirochete could be recovered from the blood, milk, and, occasionally, the urine of cows during the febrile period. Moreover, when hemoglobinuria or albuminuria occurred, the organism was present in the urine for periods long afterward. The experimental infections produced in the natural host (subcutaneous or intranasal inoculations) showed all possible variations, from no illness to death. Thus, the clinical classification (severe and mild) is of little significance other than to demonstrate the host response to the same infection.

With adult cattle, besides fever, depression, drop in milk yield, and an occasional case of albuminuria, the secretion from the udder was thick, yellowish, and viscid. In lactating cows, the inoculation of infective material never produced bloody milk. In young calves, as a rule, the infection was acute and associated with albuminuria, or, occasionally, hemoglobinuria and death. On intranasal inoculation, some calves reacted; whereas, others showed no signs of illness. When these animals were later challenged with infective material (subcutaneous inoculations), all were immune.

Inoculation of Experimental Animals.—The spirochete[1] isolated in New Jersey is readily transmissible to guinea pigs, rabbits, embryonated eggs, and mice. When guinea pigs were inoculated intraperitoneally with 1 cc. of defibrinated blood, abnormal milk (bloody or thick and viscid), or urine, a febrile reaction began three to five days after inoculation and persisted two to four days. Another characteristic feature of the disease in guinea pigs was the development of scattered petechial hemorrhages in the lungs, and minute white spots in the liver (cell necrosis), observed when the animals were killed. The lesions were more marked when the guinea pigs were autopsied after the fever had subsided.

If the guinea pigs were bled aseptically from the heart during the febrile period, and 1 cc. of defibrinated blood inoculated into normal guinea pigs, the infection could be maintained indefinitely by serial passage. The inoculations rarely resulted in the death of the guinea pig. When these animals are used in the diagnosis of leptospirosis in cattle, the absence of fever and lesions should not eliminate the spirochete as the causative agent, unless the results of other laboratory tests are also negative. Negative inoculations can be due to keeping material too long at room or refrigerator temperatures, with a resultant destruction of the spirochete. It is essential to inoculate the guinea pigs soon after the collection of blood, milk, or urine, preferably at the farm. Furthermore, unless the blood is obtained from cows that are febrile, and unless the milk is either bloody or thick and viscid, the inoculations may fail to produce infection. Likewise, when the urine from sick animals is abnormal in appearance, the spirochetes are more likely to be present in sufficient numbers to induce infection. Another fact that should not be overlooked is that some strains of bovine Leptospira have been shown to be nonpathogenic for guinea pigs. Bernkopf *et al.*,[3] in Palestine, failed to produce clinical signs of illness in guinea pigs with the blood, milk, or urine from natural cases of the disease in cattle, although this material was highly infective for the natural host.

The Isolation of the Spirochete.—The primary isolations are made by adding 0.5 cc. of infected guinea pig blood or allantoic fluid from infected eggs to cotton-stoppered glass tubes (160 mm. x 15 mm.) containing 5 cc. of Schueffner's[4] fluid medium with 0.5 cc. of sterile horse or rabbit serum. The cultures are incubated for five to seven days at 30 C. (94 F.) and then examined for growth by dark-field illumination. If leptospiras are found, transfers are immediately made to new mediums and the tubes incubated again. For the storage of positive cultures, the cotton stoppers are replaced with sterile rubber stoppers and the tubes kept at room temperature, preferably in the dark. Monthly transfers are made thereafter. Chang's[5] medium has been used with equally good results in cultivating these spirochetes.

In the diagnosis of the infection in natural cases of the disease in cattle, the spiro-

chete may also be recovered by the centrifugation of urine from affected animals at high speed (Pickles centrifuge—5 to 10,000 r.p.m.). In centrifuged samples, the bacteria and debris are thrown to the bottom of the tube, while the leptospiras remain in the supernatant fraction. The bacteria-free supernatant fluid can then be used for microscopic examination, animal inoculation, or direct culturing.

The Demonstration of the Spirochete in Tissue Sections and the Blood.—With more difficulty and less surety than by other methods, spirochetes can be demonstrated in tissues and blood. In four outbreaks of bovine leptospirosis reported in the United States, [6-9] a diagnosis was made after autopsy by the histologic examination of Levaditi's preparations of tissue sections from the liver or kidney. In two of the outbreaks, the inoculation of infective material into guinea pigs caused some response, and leptospiras were later demonstrated in stained preparations of liver or kidney tissue from these animals. Recently, Simons[10] reported that thedane blue (saponin-methylene blue solution addition compound: Negotiation Ltd., Münchenstein, Switzerland) synthesized by him, markedly simplifies all current thick-film methods for the demonstration of unicellular blood parasites in minimum concentrations. When a more detailed report of this method is published, it is possible that spirochetes may be detected more readily in the blood stream of cattle during an acute attack of the disease.

The Serologic Examination of the Blood.—Antibodies for the spirochete can be found in the serums of both experimental animals and cows recovered from the disease. Usually, the serums of cows bled at the onset of the infection fail to agglutinate or lyse suspensions of the spirochete, but two to four weeks later, the reaction of the blood is positive in a dilution of 1 : 200 or higher.

The technique employed for the isolation and maintenance of the organisms in pure culture for serologic studies in Schueffner's[4] fluid medium has been described by Bernkopf *et al.*[5, 11] and Bernkopf and Little.[12] Suffice it to mention here that both living and formolized cultures gave identical titers as a rule. Of the two methods, however, living cultures are more suitable to employ since spontaneous clumping, which not infrequently occurs with formolized cultures, is avoided. Small antibody concentration may not be detected with living cultures, since minor degrees of lysis are more difficult to read than a slight agglutination.

Both methods of testing for antibody, by lysis or microagglutination, require the use of live cultures. Obviously, a simpler method that would eliminate the continuous use of living cultures would be preferable. Recently, Musaev[13] reported his findings with the complement-fixation test, in which a lyophilized antigen was used. Further study will be necessary to determine whether the complement-fixation test is more efficient and less time-consuming than other methods for the serologic examination of the blood of cattle in this disease.

It is realized that the serologic test is a presumptive test which simply shows that antibodies for the spirochete are present in the blood of recovered or exposed cattle. When it is impossible to employ other laboratory procedures in the diagnosis of the infection in cattle, this test is very helpful. Titers of 1 : 20 or below can be regarded as suspicious, while complete agglutination or lysis in a 1 : 200 dilution is considered positive. The blood of normal cattle rarely, if ever, agglutinates or lyses suspensions of the spirochete in dilutions above 1 : 20, but when a reaction does occur in a 1 : 200 dilution, it is only weakly positive. In one survey, two self-contained herds, consisting of 18 and 21 animals, respectively, were bled. In one, no samples of the serum reacted, while in the other herd (21 animals), the serums from 2 adult cows (7 years old) that had completed five and six pregnancies, respectively, were weakly positive in a 1 : 200 dilution. These 2 cows were from an experimental herd maintained by the Institute and kept under range conditions in two large, tightly fenced-in enclosures. Although none of the cattle showed any evidence of the disease in 1946, it seems possible that at some time since birth they may have had mild, inapparent infections.

In 1945, Allam and Beck[14] reported their clinical observations on a condition of cattle, on farms near Philadelphia, of which nonspecific hemoglobinuria was the outstanding symptom. The disease was characterized by fever, jaundice, abortion, hemoglobinuria, and pink milk. The mortality was around 3 per cent, while the morbidity varied from 10 to 50 per cent in different herds. In April, 1948, 5 cows were bled, 3 of which recovered from the disease in 1946. The blood from 4 of the animals both agglutinated and lysed suspensions of the New Jersey strain isolated by Baker and Little.[1]

In the fall of 1947, Sutherland and Morrill[9] studied an outbreak of leptospirosis in a beef herd in Illinois. Two cows had died before the disease was brought to the attention of the College of Veterinary Medicine. A third cow sickened on August 4. This animal was dyspneic with a tempera-

ture of 104 F., while the visible mucous membranes were pale and icteric. The urine was distinctly brown. A diagnosis of leptospirosis was made by Levaditi's preparations from the liver of guinea pigs inoculated with material from this case. Later, another cow sickened but responded promptly to treatment with sulfanilamide and sulfathiazole supplemented with 20,000 units of penicillin. Dr. Morrill kindly sent us the serums from 30 animals that included the serum from the recovered case. The blood from 13 of the cattle agglutinated and lysed suspensions of the New Jersey strain of the Leptospira in a dilution of 1 : 200. In this herd, 12 animals had inapparent infections that were not recognized during the outbreak.

In June, 1948, a number of cows in a New Jersey herd, consisting of 45 milking animals, showed symptoms of leptospirosis. Two had hemoglobinuria, the milk of 2 others was thick and viscid, while 3 cows aborted. The veterinarian was not called until June 17, when the outbreak had about subsided. One of us (R. B. L.) visited the farm on June 18, and found that none of the animals was acutely sick. The milk from 1 cow (temperature 101.6 F.) was slightly yellowish in color but not viscid. Two guinea pigs were inoculated at the farm with a composite quarter sample of milk from this cow and 2 other pigs with the urine from a cow that had hemoglobinuria two days previous to the visit. Infection was not established in any of the pigs inoculated. Thirteen cows were bled on August 8, including 2 controls and 3 animals that had aborted since June. The serums from 9 of the cows, including 6 that aborted during May, June, and July, reacted; whereas, the serums of the 2 normal cows and 2 animals that aborted late in July were negative.

In July, 1948, during a period of five days, 16 cows sickened in another New Jersey herd of 88 milking Holstein-Friesians. The cows were febrile (temperatures 105 to 107 F.), depressed, with inappetence, and a marked drop in milk yield. The milk from all quarters was thick and viscid, and the udders were soft and limp. The duration of the attack varied from ten to fourteen days. One cow aborted during the first two days of the illness. According to the veterinarian and the owner, none of the cows had bloody milk and none was jaundiced or passed hemoglobin in the urine. Of 23 cows bled on September 15, 6 were recovered cases. All but three of the serums lysed living suspensions of the spirochete. Two of the negative samples were from cows that were in pasture during the outbreak and did not mingle with the milking herd until September.

The serologic examination of the blood of recovered cattle presents a simple test for the diagnosis of bovine leptospirosis. The high incidence of inapparent infections detected by the serologic examination of herd samples of blood indicates that during an outbreak many supposedly normal cows contract the infection.

EPIZOOTIOLOGY

The natural mode of transmission of the infection is not known. It has been suggested that ticks, insects, rodents, contaminated water, and the natural discharges from sick animals transmit the disease. Since, in New Jersey, outbreaks of leptospirosis in cattle occur more frequently during warm weather, there may be unknown vectors that serve as hosts to the spirochete from season to season. It is difficult to conceive how the organism could survive in this area either in water or in swampy pastures during the winter months, since it is so readily destroyed by refrigerator temperature. It is highly probable that the actual host for the organism from one season to another may be the bovine animal with a chronic infection (nephritis) often unobserved in a herd. The introduction of new cattle into a herd and the movement of animals within a herd offer opportunities for mild or chronic cases of leptospirosis to mingle with healthy individuals. It has been shown experimentally by the writers[1] that the organism was excreted in the urine of a calf for a period of fifty-three days after the acute symptoms had subsided. Moreover, Bernkopf[11] reported the presence of the Leptospira in the urine of cattle four weeks after infection, while the organism was demonstrated histologically in the kidneys from an affected animal eight weeks after the infection was first recognized. In natural cases of the disease, there is still the possibility that the organism may be present in the urine for periods much longer than have been observed thus far. It seems likely, then, that mild cases of leptospirosis occurring in the winter might escape detection, but such animals could be responsible for the persistence of the infection in a herd and even for the introduction of the disease into other herds.

The spirochete is usually present in the blood, milk, and, occasionally, the urine during the period that the animal is febrile. Moreover, when hemoglobinuria or albuminuria (nephritis) occurs, the spirochete may be present in the urine for long periods. Thus, the blood, milk, and urine from clinical cases of the disease in cattle may be

infective for the natural host and, in some instances, for guinea pigs, mice, and rabbits. According to Baker and Little,[1] the urine from animals excreting the organism may transmit the infection to normal cattle by nasal inoculation, which might explain the spread of the disease during an outbreak.

PREVENTIVE MEASURES

The epizoötiologic features thus far observed indicate that infection may be brought into a herd by carriers of the Leptospira. Control, therefore, should be directed toward the recognition of these carriers in order to prevent their introduction into herds of susceptible cattle. A suggested procedure follows:

1) Serologic Examination of Animals for Presence of Antibodies.—This would detect cattle that had had infection but would not indicate carriers, since antibodies would persist longer. Also, animals either in an incubation period or with acute infection would not show presence of antibodies; and, in order to detect these cases, it would be necessary to retest after a holding period of at least three weeks.

2) The urine of animals that show antibodies should be tested for leptospiras by the methods described under "Diagnosis."

Obviously, animals shown to be carriers should not be placed in contact with susceptible ones. No chemotherapeutic or antibiotic agent has been tested for elimination of leptospiras from carriers, but, should an effective one be found, it would simplify the problem and increase the reward for testing, since these animals could be salvaged.

THE CLASSIFICATION OF THE SPIROCHETE ISOLATED FROM NEW JERSEY CATTLE

The study of pure cultures of bovine Leptospira has shown that many strains not only differ in their pathogenicity for guinea pigs and mice but, occasionally, in their antigenic properties. Schueffner and Mochtar[15] reported that guinea pigs which had recovered from the inoculation of some particular strain were protected against challenge inoculations with other strains which antigenically had no relationship. Hence, it would appear that most cultures of bovine Leptospira interfere with reinfection by other strains, regardless of their serologic or pathogenic properties.

Fortunately, it was possible for us to compare the New Jersey culture with a strain that Bernkopf[12] had isolated from a natural case of the disease in a cow in Palestine. The culture was typical of the organism found there in cattle. The New Jersey and Palestine strains differed not only in their infectivity for guinea pigs but also in their antigenic properties. Nevertheless, the Palestine culture interfered with infection by the New Jersey strain in guinea pigs. Blood of recovered cattle from outbreaks occurring in New Jersey, Pennsylvania, and Illinois agglutinated and lysed suspensions of the New Jersey culture and reacted not at all, or in a very low titer, with the foreign strain.

In a more recent outbreak, in cattle in Pennsylvania (unpublished), two new strains were isolated and compared with the New Jersey culture. Cross-immunization experiments and serologic studies showed that these strains were identical. It would appear, therefore, that the bovine Leptospira responsible for outbreaks of disease in cattle in New Jersey, Pennsylvania, and perhaps Illinois is the same antigenic strain.

SUMMARY

Bovine leptospirosis is an infectious disease of dairy and beef cattle that may have existed in this country for some time, but was not recognized until 1944. It is a disease of importance to dairymen and stockmen, for, although the mortality may not be great, the losses in milk yield during an acute attack, or during a prolonged convalescence, and in the anticipated calf crop may be considerable. The clinical signs which would lead one to suspect this infection are described in some detail.

A positive diagnosis is made by the isolation of the Leptospira from infected guinea pigs or from embryonated eggs inoculated with blood from the guinea pigs. It is emphasized that inoculations be made with fresh material, since the Leptospira is very labile and may be lost if the material is chilled or kept any length of time. A presumptive diagnosis may be made by the finding of agglutinins and lytic antibodies in the serums of infected animals.

By serologic tests, it has been shown that the same antigenic strain of the Leptospira was responsible for outbreaks in New Jersey, Pennsylvania, and Illinois, and that the strain causing a similar disease in Palestine differed in its antigenicity.

References

[1]Baker, J. A., and Little, R. B.: Leptospirosis in Cattle. J. Exptl. Med., *88*, (1948):295.

[2]Little, R. B., and Plastridge, W. N.: Bovine Mastitis, a Symposium. McGraw-Hill Book Co., Inc., New York, (1946):529.

[12]Bernkopf, H., Olitzki, L., and Stuczynski, L. A.: Studies on Bovine and Human Leptospirosis. J. Infect. Dis., *80*, (1947):53.

[15]Kelser, R. H., and Schoening, H. W.: Manual

of Veterinary Bacteriology. 4th ed., Williams & Wilkins Co., Baltimore, Md., (1943):411.

[6]Chang, S. L.: Studies on *Leptospira Icterohaemorrhagiae*. I. Two New Methods for Growing *L. Icterohaemorrhagiae*, *L. Canicola*, and *L. Biflexor*, and a Method for Maintaining the Virulence of *L. Icterohaemorrhagiae* in Culture. J. Infect. Dis., *81*, (1947):28.

[7]Jungherr, E.: Bovine Leptospirosis. J.A.V.M.A., *105*, (1944):276.

[8]Marsh, H.: Leptospira in Bovine Icterohemoglobinuria. J.A.V.M.A., *107*, (1945):119.

[9]Mathews, F. P.: A Contagious Disease of Cattle Associated with Leptospira. Am. J. Vet. Res., *7*, (1946):78.

[10]Sutherland, A. K., and Morrill, C. C.: An Outbreak of Leptospirosis in Cattle. J.A.V.M.A., *113*, (1948):468.

[11]Simons, H. C. R.: Ultra-rapid Demonstration of Unicellular Blood Parasites in Minimum Concentrations by Thedane Blue Methods. Abstr. J. Parasitol., *34*, (1948, Suppl.):22.

[12]Bernkopf, H.: Report on Bovine Leptospirosis in Palestine. B.S.Z.R., Jerusalem (1948).

[13]Bernkopf, H., and Little, R. B.: Comparison of New Jersey and Palestine Strains of Bovine Leptospira. Proc. Soc. Exptl. Biol. and Med., *69*, (1948): 503.

[14]Musaev, M. A.: Veterinariya, *25*, (1948). Abst. by Habel, R. E.: Complement-Fixation Test for Leptospirosis. J.A.V.M.A., *114*, (1949):436.

[15]Allam, M. W., and Beck, J. D.: Meteorological Hemoglobinuria in Cattle. Vet. Ext. Quart. Univ. Pa., No. 101, (1946):26.

[16]Schueffner, W., and Mochtar, A.: Versuche zur Aufteilung von Leptospirenstämmen, mit einleitenden Bemerkungen über dem Verlauf von Agglutination und Lysis. Z. Bakt., Abt. 1., Orig., *101*, (1926-27):405.

Higher Ratio of Staphylococcic Mastitis?

If the ratio of staphylococcic mastitis is increasing in your practice, widespread use of penicillin may be the explanation. R. L. Mitton, practitioner of South Australia, reports such a trend, which he attributes to the following (*Austral. Vet. J.*, Aug., 1949):

1) Widespread over-the-counter sale of penicillin has induced many owners to treat mastitis without the services of a veterinarian. The veterinarian is called only if the home treatment fails—the failure often being due to penicillin-resistant staphylococci.

2) In other words, Streptococcus is still king of mastitis, but the effectiveness of penicillin against it, compared with lesser effectiveness of this drug against staphylococci, leaves more of the latter to confront the practitioner.

Veterinarians, themselves, come in for a share of the blame, too. Diagnosis on the basis of hasty and inadequate sampling may result in treatment that is just as indiscriminate as the over-the-counter way.

Are country practitioners too busy for comprehensive sampling, as many of them claim? On the contrary, the author chides, they are too busy not to do the job thoroughly the first time. In the long run, detecting and treating incipient cases takes less time than trying to combat advanced infections that have thrived on hasty diagnosis.

Reporting Morbidity and Mortality in Farm Animals

Although the value and the need for statistics on morbidity and mortality of farm animals is widely recognized, no system has been inaugurated for making this a reality.

Some of the weak points which exist under present conditions are: (1) Our knowledge of total losses from any given disease is based entirely on estimates arrived at through various and sundry channels. We have little definite information. (2) In many cases, we are not sure of the species of animals that are affected by a given disease. (3) There is no general realization of the areas in which particular diseases may be seen regularly. (4) The new areas of infection become old before the proper authorities have become acquainted with their presence. (5) Diseases strange to this country may not be reported immediately.

These conditions must be corrected before we can properly and quickly control or eradicate livestock diseases.—*C. E. Wicktor, D.V.M., California.*

Newest Cancer Theory

According to an editorial in the *Journal of the American Medical Association* (Sept. 17, 1949), mammary cancer is a virus disease transmitted to young mice by the mother's milk. Gross (*Surgery, Gynecology, and Obstetrics*), whose work the editorial quotes, believes that the same phenomenon is applicable to other mammals, including man, and also to other forms of newgrowths. The author assumes that there may be transmitting agents other than milk (ovum) that pass the virus through successive generations without necessarily causing symptomatic cancer, some generations being "skipped."

It is a veterinarian's civic duty to be present at the horse shows in his neighborhood and to take part in the activities connected with them.—*A. H. Riley, D.V.M., Kansas.*

Anatomy and Pathology of the Bovine Teat

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FOR THE proper approach to any problem in surgery, a knowledge of the anatomy of the region involved, and of the lesions one is likely to encounter in the region, is vitally necessary. Variations from the usual anatomical structure of the bovine teat are reported in the literature, but no data are available on how often one may expect to see these variations. Likewise, no data are available on the incidence of various teat lesions in the United States. To obtain these data, 702 bovine teats were studied for their anatomy and lesions.

ANATOMY OF THE TEAT

Johnston[9] reported that the circumference of the papillary duct (teat canal, streak canal) varied in different parts, and that, usually, the greatest circumference was at the upper end and the smallest at the lower end of the duct. Only a few teats had the same circumference throughout the length of the papillary duct. Hug[6] and Foust[3] described longitudinal, transverse, and oblique folds of the mucous membrane on the wall of the teat sinus (cistern). Where the transverse and oblique folds intersect the longitudinal ones, recesses or pockets are formed (Johnston,[9] Foust[3]). Venzke[16] stated that there may be a circular fold at the junction of the teat and gland sinus. This fold was not common in his material. Rachow[13] found this fold in 6 per cent of the teats that he examined. Under the mucous membrane of the teat sinus, blood vessels may be found that either completely or incompletely circle the teat wall (Fürstenberg,[4] Riederer,[14] Foust[3]).

TABLE I—Shape of Papillary Duct

Shape	Teats (No.)	Per cent of total
⟩⟨	539	80.3
||	69	10.2
⟩⟨	56	8.3
⟩⟨	7*	1.0

* All of the teats with the smallest circumference at the upper end of the papillary duct had lesions either in the papillary duct or on the teat end.

Procedure.—The teats used in this study were obtained from cows slaughtered at nearby abattoirs and from cows that had died from various causes at the Stange Memorial Clinic, Iowa State College, Ames.

At the Iowa Packing Company, which supplied most of the material, teats were taken from every cow that came on the killing floor, until all of the cows available for that day had been killed or until enough teats had been collected for that week. The only exception to this were cows upon which a U.S. Bureau of Animal Industry inspector had placed a "retainer tag" and teats could not be taken from them. The breed from which the first 166 teats were taken was not known. The rest of the teats at the packing house were collected in gauze bags. The teats from each cow were placed in a separate bag with a tag containing the name of the breed and whether mastitis was present, as judged by the appearance of the milk. The teats obtained at the locker plant were collected by the workers there, and those collected at the Stange Memorial Clinic were removed at the time of necropsy.

The teats were examined externally and then opened with a pair of Fitch avian postmortem scissors, beginning at the distal end of the teat. If an obstruction was encountered, the procedure was altered to present the best view of the abnormality. If there was any doubt as to whether a structure was prenatal or postnatal in origin, sections were taken for microscopic study. The paraffin method of preparing tissue for microscopic study was used. The sections were cut 5, 7, or 10 μg. thick. Most of the sections were stained with hemotoxylin and eosin and the remainder with Weigert's and Van Gieson's connective tissue stains.

In compiling the results, the different breeds were classified under three types, as the number of some breeds was too small to indicate any trend statistically. Aberdeen Angus and Hereford breeds were classified as beef type; Ayrshire, Guernsey, Holstein-Friesian, and Jersey breeds as dairy type;

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and Brown Swiss and Shorthorn breeds as dual purpose. This classification was not perfect, as both milking and beef-type Shorthorns were classified as dual-purpose. However, it was impossible to determine which of the Shorthorn cows were beef and which were milking type on the killing floor.

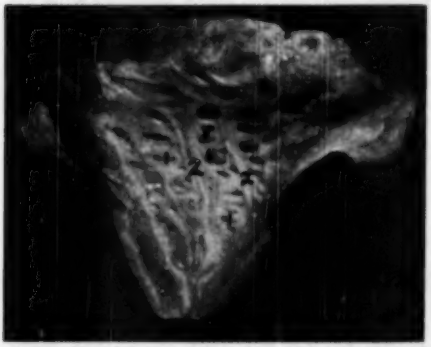

Fig. 1—Sagittal section of a teat showing pockets (1) formed by the intersection of the longitudinal folds (2) by transverse (3) and oblique (4) ones.

As the specimens were taken from canner cows, and most of the Shorthorns were native cattle, it is reasonable to assume that most of the Shorthorns were of the milking type which were properly classified as dual purpose cattle. The Herefords which comprised the greater part of the beef type cows were almost entirely old cows shipped in from the western range.

In the table of statistics, the number of teats does not in every case correspond with the number of cows. A few of the teats were mutilated by the packinghouse workers; 1 cow had only three teats, and in other cases lesions made it impossible to record data on certain structures.

Results and Discussion.—The shape of the papillary duct varies as shown in table 1. Of the teats examined, 80 per cent had the smallest circumference of the papillary duct near the distal end, 10 per cent had the same circumference throughout the length of the duct (parallel walls), 8 per cent had the smallest circumference in the center, while 1 per cent had the smallest circumference at the proximal end of the papillary duct. In the teats examined, it was not normal for the smallest circumference of the papillary duct to be at the proximal end of the teat as lesions were found which involved the papillary duct of all such teats. The ducts with the smallest circumference at the distal end, and those with the same circumference throughout the length of the duct, appear to leave the smallest area at the end of the teat for bacteria to gather and multiply.

Approximately the same number of beef and dual purpose cattle had pockets or recesses formed by the intersection of the longitudinal folds by the transverse and oblique ones (fig. 1). A slightly higher per cent of the dairy type cows had pockets in the teat sinus (beef type 67%, dual purpose 68%, dairy type 75%). Of the teats that had pockets, there was little difference between the breed types as to the number of pockets. Each breed type averaged about 5 pockets. The number of pockets found in individual teats varied from 1 to 30. Some formed deep and complicated recesses which were as deep as 0.4 cm. These recesses opened into other pockets; sometimes as many as 3. Occasionally, lactiferous ducts were found to empty directly into the teat sinus instead of into the gland sinus. These ducts were not counted as pockets. The pockets found in the wall could act as reservoirs for bacteria. It is difficult to see how some of the deeper and more complicated pockets could be completely emptied during milking.

Fig. 2—Photomicrograph of a section taken from a band on the wall of the teat sinus. Note proliferation of connective tissue cells on the border (1) and the dark staining areas of calcification (2). Delafield's hematoxylin and eosin stain. x 34.

Of 536 teats, five (1%) had a blood vessel forming a ridge on the wall of the teat sinus. One of these vessels had a diameter of 2 mm. If present, these blood vessels would be very important in surgery of the

teat sinus. If one of them were severed, especially by an instrument inserted through the papillary duct, the hemorrhage would be difficult to control.

Three of 702 (0.4%) of the teats had a longitudinal septum which extended from a point just above the rosette to the junction of the teat and gland sinuses. The longitudinal septum in two of the teats divided the teat sinus into chambers of equal size. In the third teat, one chamber contained about a third of the space in the teat sinus while the other chamber contained the remaining two thirds. Jensen[7] mentioned similar structures which he found in three of 2,081 teats.

Of 702 teats, 33 (4.7%) had a rudimentary fold at the junction of the teat and gland sinuses. The folds extended completely around the wall in this area.

PATHOLOGY OF THE TEAT

Very little information has been published on the occurrence of external and internal teat lesions. Jepsen[8] found external lesions on 0.6 per cent and internal lesions in 56.0 per cent of 500 teats. Feldman[2] states that teats and teat canals often give rise to papillomas. Jensen[7] reported internal lesions in 28 per cent of 2,081 teats. Vennerholm[15] believed that most of the obstructions of the teat sinus were the result of rupture of the mucous membrane followed by connective tissue formation, papillomas, fibrous growths, and membranous partitions. Hug,[6] basing his conclusions on clinical examinations and treatment, concluded that catarrhal mastitis was the most important cause of closure of the teat sinus with trauma next in order of importance. Dykstra[1] gave trauma or infection as the cause of atresia of the papillary duct and infection as the most important cause of closure of the teat sinus. Hudson[5] listed the causes of hard milking as stricture of the papillary duct, inflammation around the papillary duct, blood clots and concretions in the teat sinus, and fibrous swelling of the teat sinus folds. Kuhn[11] gave trauma as the most important cause of obstruction of the teat. He believed that these indurations were the result of continued irritation produced by the milker applying too much pressure with his fingers while milking. Nuesch[12] concluded that most of the teat lesions were the result of self-inflicted traumatism. Jung[10] concluded that trauma was the most important etiologic factor of teat lesions. He gave the microscopic picture as one of conversion of the two-layered mucous membrane epithelium into stratified squamous epithelium. Kuhn[11] stated that the epithelial covering of the teat sinus became elevated, thick, and horny, being transformed into stratified squamous epithelium.

Procedure.—The same as given above under Anatomy of the Teat.

Results and Discussion.—External Lesions.—Evidence of external injury was shown by 7.5 per cent of all the teats. Lacerations, or evidence of lacerations, were found on 3.5 per cent of them, and abrasions or contusions on the remaining 4 per cent. There was no significant difference between breeds or types.

Papillomas were found on 11.2 per cent of the teats, of which 2.5 per cent were near the teat orifice. Some of these could have interfered with the passage of milk from the teat orifice, and all could have provided a place for bacteria to gather and multiply.

Small elevated epithelial formations

Fig. 3—Teat showing extensive submucosal hemorrhage with no external sign of injury. Note the large dark area of hemorrhage.

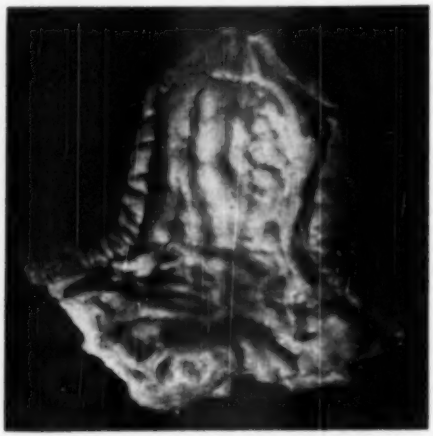

Fig. 4—Teat from a quarter which was known to have mastitis. Note the connective tissue proliferation on the wall of the teat sinus.

called "plaques" were found on the skin of 59 per cent of the teats. Their size ranged from that of a pin point to 1 cm. in diameter and were unpigmented regardless of whether the skin of the teat was pigmented or unpigmented. Microscopic examination showed hypertrophy of the prickle cell layer and hyperplasia of the stratum granulosum. In specimens taken over a period of six months, there was some indication that there may be a seasonal variation in their occurrence. More work needs to be done on the etiology, development, and pathologic significance of these formations before a name is attached to them.

Internal Lesions.—There were lesions in the papillary duct of 2.2 per cent of the teats. These lesions were hemorrhage in the wall of the papillary duct, hyperplasia of the stratified squamous epithelium lining it, or complete stenosis of the duct.

There were lesions in the rosette area of 2.5 per cent of the teats. These lesions were either papillomatous formations or inflammation of the area. On only two teats did these formations form flaps which could have interfered with the passage of milk. Jepsen[8] found papillomatous formations in 14 per cent of the teats. He believed that vigorous hand milking was the cause of this condition.

Ring formations formed a circle on the teat sinus wall of 7.2 per cent of the teats. These rings had a narrow base and the sides formed an acute angle. Some of the rings presented a wavy appearance but the majority formed straight lines. Some formed rings that extended completely around the teat sinus wall while others formed incomplete rings. Two, and sometimes three, such rings were found on the same teat parallel to each other. Microscopically, the rings consisted of connective tissue covered with stratified squamous epithelium. One teat had a circular rupture of the mucous membrane which was the result of trauma. This could be the forerunner of the ring formations. The ring formations were up to 5 mm. high and did not appear capable of interfering with the passage of milk. Ten per cent of the dairy and dual-purpose type cows had these formations, while only 2 per cent of the beef type cows had them.

Star-shaped epithelial formations were found on 1.4 per cent of the teats. These lesions presented the same general microscopic picture as the ring formations. The star-shaped formations were lower in height than the ring formations and, although one was 2.5 cm. in diameter, they did not appear capable of interfering with the passage of milk.

Flattened, elevated bands were found on 2.9 per cent of the teats. The bands had a much wider base (the largest being 2 cm. wide) than the ring formations described above. Most of the bands formed a complete circle on the teat sinus wall. The top of these formations presented an uneven border with papillae projecting from it. Small areas of hemorrhage could be observed on the surface of some of these bands. Microscopic examination showed an abrupt change from the two-layered epithelium of the teat sinus to stratified squamous of the band. The cornified layer was also present and there was an increase in connective tissue. A microscopic section of a recently traumatized band is shown in fig. 2. There was congestion and hemorrhage with connective tissue cells interspersed. The deeper layers contained areas of calcification showing that the original lesion was an old one. These lesions could continue to increase in size under the stimulus of continued trauma and thus interfere with the passage of milk.

Submucosal hemorrhages were seen in 1.6 per cent of the teats. Some were quite extensive, as shown by fig. 3. Many of the teats with extensive internal injury showed no external evidence of injury. Microscopically, these areas showed petechial hemorrhages, congestion of the blood vessels, and leucocytic infiltration.

There were lesions that completely stopped the passage of milk through the teat sinus in 1.1 per cent of the teats. One teat had an occlusion in the upper third, and another in the lower third, of the teat sinus. The one in the upper third was caused by a cyst in the wall that appeared to have formed in an accessory teat gland. The lower occlusion was due to connective tissue formation. One half of the teats with occlusions had pus in the teat.

Diffuse changes in the teat sinus of 1.4 per cent of the teats included mucosal hemorrhage, small miliary proliferations, and diffuse thickenings of the teat wall. Seventy-five per cent of these teats were from udders in which mastitis was known to be present, as determined by the milk at the time the teats were removed. Fig. 4 shows a teat with diffuse thickenings taken from a quarter with mastitis. Microscopic examination of a section taken from this teat revealed areas of denudation of the outer epithelial layer of the mucous membrane, leucocytic infiltration, and connective tissue proliferation. In all of the teats where diffuse thickenings of the teat sinus wall were present, abnormal milk was found in the teat sinus—indicating mastitis in that quarter.

Internal lesions were found in 27.4 per cent of the teats and 55.5 per cent of the cows; 26.9 per cent of the cows had lesions in only one teat while 29.3 per cent had

lesions in two or more teats. The average of 27.4 per cent of the teats showing internal lesions is practically the same as the average of 28 per cent found by Jensen.[7] It is considerably lower than the average of 56 per cent found by Jepsen[8] who also found changes due to mastitis in 25 per cent of the teats examined as against diffuse changes due to mastitis found in 4.4 per cent of the teats reported here. Evidently, Jepsen was examining teats from a large number of cows slaughtered because of mastitis.

SUMMARY AND CONCLUSIONS

1) Anatomical structure and lesions of 702 teats were examined. On 500 of these, the breed of cow from which they came was known.

2) The smallest circumference of the papillary duct in most of the teats was found to be near the distal end.

3) It would seem that teats with the smallest circumference of the papillary duct in the center or at the proximal end would leave an area at the end of the teat for bacteria to gather and multiply.

4) Of the teats examined, 70 per cent had pockets in the teat sinus wall formed by the intersection of the longitudinal folds by transverse and oblique ones.

5) Blood vessels formed ridges on the walls of the teat sinus in 1 per cent of the teats.

6) A rudimentary fold was found at the junction of the teat and gland sinuses in 4.7 per cent of the teats.

7) Small, elevated epithelial formations (plaques) were found on 59 per cent of the teats.

8) There were papillomas on the skin of 11 per cent.

9) Evidence of external injury was shown by 7.5 per cent of the teats.

10) There were internal lesions in 27.4 per cent.

11) Internal lesions were found in one or more teats of 55 per cent of the cows.

12) Of these cows, 29.3 per cent had internal lesions in two or more teats.

References

[1] Dykstra, R. R.: Surgical Diseases of the Udder in Cattle. North Am. Vet., *5*, (1924): 66-68; 122-124.

[2] Feldman, Wm. F.: Neoplasms of Domesticated Animals. W. B. Saunders Co., Philadelphia, Pa., (1932): 270.

[3] Foust, H. L.: The Surgical Anatomy of the Teat of the Cow. J.A.V.M.A., *98*, (1941): 143-149.

[4] Fürstenberg, M. H. F.: Die Milchdrüsen der Kuh. Wilhelm Engelmann, Leipzig, (1868): 23-33.

[5] Hudson, R.: Some Diseases of the Udder and Teats of Cattle. Vet. Rec., n. s., *8*, (1928): 205-212.

[6] Hug, J.: Beiträge zur pathologishe Anatomie und Therapie der Zitzenstenosen des Rinds. Schweiz. Arch. f. Tierheilk., *48*, (1906): 31-56.

[7] Jensen, C. O.: Pattesygdomme hos Koen. Maanedsskr. Dyrl., *7*, (1895): 401-413.

[8] Jepsen, Aage: Nogle Problemer Vedrrende Haardmaelkethed hos Koen. Medlembl. danske Dyrl., *18*, (1935): 205-227.

[9] Johnston, Thomas: Anatomical and Experimental Study of the Treatment of the Cow with Particular Reference to Streptococcal Mastitis. J. Comp. Path. and Therap., *51*, (1938): 69-77.

[10] Jung, M.: Vorkommen und Pathogenese von Leukoplaken in der Zitze des Rindes. Inaug. Diss., Hannover, (1942). Original not seen; abstr. in Deutsche. Tierärztl. Wchnschr., *50*, (1942): 391-392.

[11] Kuhn, Emil: Ueber Schwielenbildung, chronisch Katarrh und traumatische Verengerung der Zitze des Kuheuters. Arch. f. Wissensch. prakt. Tierheilk., *29*, (1903): 626-645.

[12] Nuesch, A.: Zitzen-Selbstquetschungen und ihre Behandlung. Schweiz. Arch. Tierheilk., *54*, (1912): 128-135.

[13] Rachow, Hans-Gunther: Bau und Enstehung der stenosierenden Ringfalten in der Zitze des Rindes. Inaug. Diss., Hannover, (1941). Original not seen; abstr. in Schweiz. Arch. Tierheilk., *87*, (1945): 441-442.

[14] Riederer, Th.: Über den Bau der Papilla mammae des Rinds. Arch. Wissensch. prakt. Tierheilk., *29*, (1903): 593-625.

[15] Vennerholm, J.: Spenfortrangningar hos kor. Svensk Vet.-tidskr., *2*, (1897): 49-59.

[16] Venzke, Carl E.: A Histologic Study of the Teat and Gland Cistern of the Bovine Mammary Gland. J.A.V.M.A., *96*, (1940): 170-175.

Serologic Relationship of Mumps and Avian Pneumoencephalitis

Presence of neutralizing and antihemagglutinating factors against the virus of avian pneumoencephalitis (Newcastle disease) in about 50 per cent of patients convalescing from mumps suggested a possible close relationship between the two viral agents (*Science*, Sept. 30, 1949). Pending further research to clarify the relationship, the investigators warned that "a diagnosis of Newcastle disease in humans should be made with caution, especially in the absence of a virus isolation."

Erwin Jungherr, a veterinarian, of the University of Connecticut, headed the veterinary medical-public health team which made the study. Associates were R. E. Luginbuhl and L. Kilham of the Harvard School of Public Health.

Foot-and-Mouth Vaccination.—Granted that the vaccine used conforms to approved specifications, the vaccination of 2,500,000 cattle against foot-and-mouth disease every four months in Mexico is by and large the biggest trial which that control measure was ever given. If it fails, the whole program for handling disease will need to be reëxamined.

A Study of Blood Tests for Brucellosis Grouped According to the Age of the Animal

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UNDER the New York state plan for the control of brucellosis, the herds under plan A are blood tested, and the calves are vaccinated with strain 19. The calves in the herds included in plan B are vaccinated, but these herds are not blood tested. Herds that are recent additions to plan A are recruited from plan B.

The purpose of this study was to obtain answers to the following questions:

1) Do we have evidence of protection through vaccination of the younger cattle of the herds in plan A?

2) In what percentage of the younger cattle is the reaction due to infection with a field strain, through exposure to the older cattle which are reactors?

3) What percentage of the younger cattle are retaining a reaction due to vaccination?

The A plan for the control of brucellosis has been in operation since 1942. The reports of the blood test on those herds tested during December, 1948, and the first three days of January, 1949, were the source from which the results of the blood tests were tabulated and reported in the first division of table 1, which has been designated vaccinated animals. The blood samples from the vaccinated group were from 509 herds included in the official vaccination program under plan A. Of these herds, 208 were without reactors and 301 were infected herds. Herds of 5 animals, or less, were not included, as they were considered too small to afford typical conditions of exposure if any of the older animals were found to be infected.

It was decided to divide the animals of these herds into four groups according to age, those between 1 and 2 years forming the first group. These would not be in production, and would probably be more or less segregated from the rest of the herd, which would protect them from exposure. Many of the owners do not include animals under 2 years of age in the blood test, so this group would be too small to be representative. While these tests were recorded and reported in table 1, the results are not thought to be significant. The second group (chart 1, line 2) includes all animals 2 and 3 years of age. At these ages, immunity should be at its highest following vaccination as calves. It is probable that all of the animals in this group have been vaccinated and would be more or less exposed to the

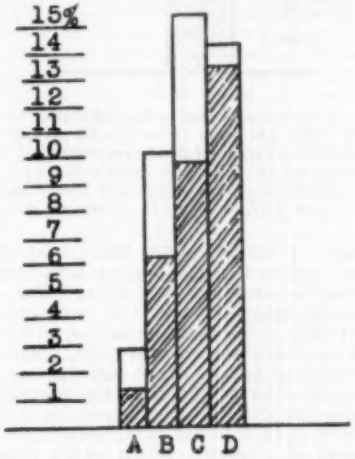

Chart 1—Percentage relationships of data in table 1. The white, or unshaded, portion represents the control group, and the shaded area represents the percentage of reactors in each age group of the vaccinated animals and is superimposed on the control group. A=1-year age group; B=2- and 3-year age group; C=4- and 5-year age group; D=over 5 years old.

animals in the older age groups. In the third group of animals, 4 and 5 years of age, many may have been vaccinated. Animals in herds that were entered in the program late might not have been vaccinated. At this age, the immunity of some of the vaccinated animals may have started to decline. The fourth and last group of animals includes all over 5 years of age. Most of these would not have been vaccinated with strain 19, and a reaction would most likely indicate infection with a field strain.

The second division or control group, in table 1, gives the results of blood tests obtained from the reports of initial tests on

From the Bang's Disease Control Laboratory, New York Department of Agriculture and Markets, Albany.

I wish to thank Mr. W. W. Henderson of the Statistics Bureau of the Department of Agriculture and Markets for assistance and suggestions in preparing this paper.

291 herds tested in 1934 under the Federal Indemnity Plan. The animals were divided according to age in the same manner as those reported in the first division. The same standards were used in the interpretation of the tests and no retests were included. It was thought that these tests would represent conditions in herds where no control measures were being taken and could be compared with the test reported under plan A of the vaccination program.

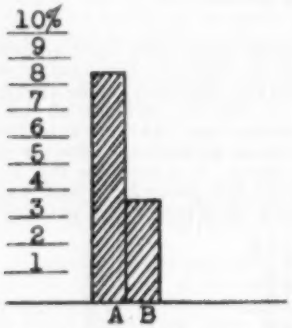

Chart 2—Percentage relationships of figures on the 2- and 3-year age group (table 2)—5.0 per cent due to infection; 3.5 per cent due to vaccination. B=animals exposed to vaccinated animals (3.5%). A=total animals infected—8.5 per cent (5.0% field infection plus 3.5% exposed to vaccinated animals).

In making such a comparison, there are a number of factors other than vaccination which may have influenced the percentage of reactors found. The longer an animal remains in an infected herd, the greater the chances of exposure, which would account for the higher percentage of reactors in the older group. Herds in which replacements are made by purchase have usually a higher percentage of reactors. Herd owners who raise their own replacements usually have a higher percentage of young animals. The proportion of negative herds was higher in the control group than in the vaccinated group. In 1934, with lower prices for cattle, owners were more willing to dispose of reactors or cows that had aborted. Many of the larger and more heavily infected herds are entered in the B plan for vaccination and are not blood tested.

It seems doubtful that any factor other than vaccination would account for the greater part of the reduction in the percentage of reactors in the vaccinated groups of 2- and 3-year-old and 4- and 5-year-old animals as compared with the controls of the same age groups.

The percentage relationships in table 1 are indicated in chart 1. The white or unshaded portion represents the group of control animals, and the shaded portion represents the percentage of reactors in each age group of the vaccinated animals and is superimposed on the control group.

A further study of the herds and animals in the 2- and 3-year group of animals, which were vaccinated, shows 85 herds which have

TABLE 1—Results of Herds Tested During December, 1948, and the First Three Days of January, 1949

Age (years)	Reactors (No.)	Suspicious	Negative	Total	Reactors (%)
Vaccinated group					
1	3	17	192	212	1.3
2 and 3	183	357	2,437	2,977	6.1
4 and 5	337	323	2,807	3,467	9.7
Over 5	453	249	2,642	3,344	13.5
Totals	976	946	8,078	10,000	9.76
Control group*					
1	36	40	1,129	1,205	2.9
2 and 3	213	118	1,756	2,087	10.2
4 and 5	205	94	1,024	1,323	15.4
Over 5	243	162	1,301	1,706	14.2
Totals	697	412	5,212	6,321	11.02

*Results of blood tests obtained from the reports of initial tests on 291 herds tested in 1934 under the Federal Indemnity Plan.

134 reactors in the 2- and 3-year group as well as reactors in either the 4- and 5-year group or in the group over 5 years, or in both groups. There were also 178 herds without reactors in the 2- and 3-year group, which was composed of 866 negative animals although there were reactors in one or in both of the older age groups. If these herds were combined, we would have 1,577 animals, 2 and 3 years of age, that have been vaccinated and exposed to the field infection as shown in line A of table 2.

Line B in table 2 is a group composed as follows: 38 herds in which there were 317

TABLE 2—Results of Further Study of Herds and Animals of the 2- and 3-Year Age Group

	Exposure	Herds	Reactors (No.)	Total	Reactors (%)
A	Field infection	263	134	1,577	8.5
B	Vaccinated animals	246	49	1,400	3.5
Totals		509	183	2,977	6.1

Percentage due to exposure = 5.0.

animals in the 2- and 3-year group, of which 49 were reactors. In these herds, there were no reactors in the 4- and 5-year group or in the group over 5 years. Of these 38 herds, 29 had only 1 reactor, 7 had 2 reactors, and 2 large herds had 3 reactors. This would indicate that there had been no spread of infection, which is characteristic of strain 19. I believe that we may safely conclude that these 49 reactions are due to vaccina-

tion of these animals and do not represent infection with a field strain. To these 38 herds, there were added 1,083 animals in the 2- and 3-year groups found in 208 negative herds. The combined figures are given in line B of table 2.

The percentage relationships in table 2 are indicated in chart 2.

REMARKS

It was found that 1 per cent of the animals in the entire group were over 10 years of age, indicating that in most herds all of the animals are completely replaced within a period of ten years. If plans to increase the rate of replacement were adopted, the reactors in the older age group would be removed from the herd much more rapidly, and this would reduce the risk of exposure in the younger age groups.

CONCLUSIONS

If we assume that there have been no errors due to sampling or other causes, we may conclude that:

1) Chart 1, which shows the percentage of reactors in each group, is good evidence of the protection afforded by vaccination in the 2- and 3-year-old and the 4- and 5-year-old groups.

2) Of cows vaccinated as calves, and exposed to brucellosis, 8.5 per cent will react at the age of 2 to 3 years. Of these animals, 3.5 per cent will be reactors due to vaccination and 5.0 per cent will be reactors due to field infection.

3) Of animals vaccinated as calves, 3.5 per cent will, at the age of 2 to 3 years, continue to show a reaction due to the vaccination.

Clinical and Public Health Aspects of Leptospirosis

A high proportion of the cases of acute and subacute nephritis in young dogs may be due to Leptospira infection. Leptospira also may play an important role in chronic nephritis of old dogs, and residual infection in apparently recovered dogs may account for recurring attacks of subacute nephritis in those at, or above, middle age.

Heavily feathered breeds with short legs appear to be highly susceptible, due to greater opportunity for contact between hair around the external genitalia and contaminated ground or objects. Despite the known ability of Leptospira to invade intact skin, the dermis of the dog probably is an impenetrable barrier, with the exception of the interdigital fossa, where the skin is thin and, therefore, easily penetrable. Low incidence of the disease reported by some observers during dry periods and high incidence during wet months is a seasonal aspect worth considering.

Laboratory examination is urged in diagnosing all cases. Suspicion is warranted when there is depression, vomiting, a tucked-up appearance, and discoloration of the tongue, with or without renal involvement. Differential diagnosis must exclude virus diseases (absence of catarrhal symptoms in leptospirosis is helpful), obstruction of the alimentary tract by a foreign body or neoplasm, and nephritis due to other causes.

Penicillin is indicated in primary uncomplicated cases of *Leptospira canicola*, but results with this drug may be disappointing in the secondary renal stage or in cases due to *Leptospira icterohemorrhagiae*. The recent work with streptomycin, by Brunner and Meyer,* emphasized the superiority of this drug over penicillin because it banishes the carrier state. Response to serum treatment is variable, but it may be worth a trial.

A concluding thought is that cats may be underrated in this disease picture, notwithstanding the scarcity of data on feline leptospirosis. The reacting uncastrated tom which urinates indiscriminately in houses or other places where children play is viewed as a potential human health threat. Practitioners should advise clients nursing infected pets to wear rubber gloves and to use other routine sanitary precautions. Concurrent cases of Leptospira infection in a pet and members of the household call for close coöperation between physician and veterinarian.—*Joan O. Joshua, Vet. Rec., Oct. 29, 1949.*

*Streptomycin in Canine Leptospirosis, J.A.V.M.A., *114,* (1949):180.

Parasitism in farm animals must be considered in stages other than the adult, because in many instances the larval form is much more damaging than any other stage. This is highly important, because this stage is the most difficult to reach with medication, and therefore emphasizes the need for breaking the life cycle at some other point —preferably by preventing or reducing the initial ingestion of infective ova.—*A. H. Groth, D.V.M., Missouri.*

One dairy cow provides about as much veterinary practice as 20 feeder steers. Knowledge of beef cattle management, correct type, and popular pedigrees are necessary for success in feeder cattle practice, because they are important factors in the profit derived from this type of livestock.—*F. B. Young, D.V.M., Waukee, Iowa.*

The Pathology and Bacteriology of Infectious Atrophic Rhinitis in Swine

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THE ETIOLOGIC agent of rhinitis in swine is not yet known. Imminger considered the disease as infectious—*vide* Hutyra and Marek.[7] Since then, however, the essential nature of the disease has been a matter of dispute.

Jensen[8] gave a description of the so-called sneezing disease of swine in Denmark. There is little doubt that this disease is identical with the one dealt with by us. Jensen was unsuccessful in his transmission experiments and concluded that the disease was not infectious. We agree with his observation that typical lesions may be found, on autopsy, in pigs that have shown no evidence of the disease during life.

The disease has been reported from many countries in Europe, but the Swedish workers appear to have given it most attention. Hoflund[6] was of the opinion that hereditary factors had significance in producing the disease. Other Swedish workers, Thunberg and Carlstrom,[12] favored the infectious theory, while Hjärre[5] observed that rhinitis frequently follows swine influenza and believes it to be a sequel of this disease.

Doyle, Donham, and Hutchings,[2] reporting on the disease in Indiana, pointed out the distinguishing features between infectious atropic rhinitis and the disease called "bull-nose" with which it is frequently confused.

In Canada, rhinitis did not become prevalent until a decided increase in swine production followed the outbreak of World War II.

Phillips,[10] from his observations, believed it to be extremely infectious. Duthie[3] reported negative results in his transmission experiments, using pigs from 6 to 12 months of age.

At the Ontario Veterinary College,[1] rhinitis has been transmitted by contact and by nasal instillation of washings from affected swine, by exposing pigs within a few days after birth. A series of contact experiments left us in no doubt that atrophic rhinitis is an infectious disease. Our attention was then focused on experimnts to reveal the source and nature of the infection. Details of these experiments need not be considered in this paper, but it is of interest to record: (1) that nasal discharge from affected swine reproduced the disease when instilled into the nostrils of recently farrowed pigs; (2) that pigs infected in this manner readily transmitted the disease to litter mates; (3) that nasal instillation of feces and urine failed to reproduce the disease in susceptible pigs.

Presented before the Section on Research, Eighty-sixth Annual Meeting, American Veterinary Medical Association, Detroit, Mich., July 11-14, 1949.

PATHOLOGY

The physical changes which occur in rhinitis show marked variation depending upon the extent and severity of the infection. Many cases are characterized by marked deformity of the face. In others, although the disease has been severe, the injury has been bilateral, so that deformity is either absent or is not readily observed. When, however, the damage has been unilateral, deformity is greatly accentuated. It is necessary to keep in mind the fact that many strains of Yorkshire swine have been bred selectively, for a short nose. This occasionally makes it difficult to recognize the disease by physical appearance alone.

GROSS PATHOLOGY

The Turbinate Bones.—In the earliest stage of the disease, numerous small foci of congestion may be seen on the mucous membrane which covers the external surface of the turbinate bones. These foci, being slightly depressed, may give a finely mottled or eroded appearance to the mucous membrane. The turbinates soon become less rigid and can easily be penetrated by any sharp-pointed instrument. These areas of softening are interspersed with areas of firm bone. In two to four weeks, the inorganic salts may have been almost entirely removed, so that the turbinate has disappeared and a narrow strip of firm tissue covered by mucous membrane alone remains. A mucopurulent discharge is present in the nasal passage. In many early cases, the external surface of the turbinate is practically free from any inflammatory exudate. If the bone is removed and examined, a tenacious mucopurulent discharge fills the inner and lesser curvature of the bone.

The Ethmoturbinates.—In early cases, these structures are not involved but in the majority of cases of advanced rhinitis, the ethmoturbinates show varying degrees of damage. Frequently, the ethmoid cells ap-

pear normal but when removed and examined, these delicate bony cells are found to be filled with a tenacious mucopurulent exudate. This may easily be overlooked. In advanced cases, the turbinates undergo decalcification, and the space remaining is filled with a purulent exudate. It is surprising that meningeal infection is not more frequent.

The Face.—The frequent distortion of the face has already been mentioned. The intimate relationship of the dorsal turbinate in the pig to the long nasal bone would readily explain the failure of normal development in this bone when the dorsal turbinate is severely injured by the presence of a suppurative inflammation. The facial bones are long and grow rapidly in the young pig, hence any interference with the development, if unilateral, causes a marked deflection of the nasal bone on the opposite side. When both of the nasal bones are affected, the face may have a "dished" appearance, the thick skin covering the snout becoming heavily wrinkled.

HISTOPATHOLOGY

A few words with regard to the normal histology of the turbinate bones may be helpful. The epithelium of the Schneiderian membrane, which covers the delicate turbinate bones, is of the stratified columnar variety and rests on a well-defined basement membrane. The surface cells are ciliated, and goblet cells are numerous. The stroma is quite thick, from 3 to 5 mm., and contains a network of numerous large veins which give the appearance of erectile tissue. There are several well-marked arterioles. Scattered throughout are many glands, both mucous and serous. The stroma comes into direct contact with the periosteal covering of the delicate trabeculae which form the bony skeleton of the turbinates. The medullary portion of the bone is wide and composed of a loose vascular connective tissue. The bony trabeculae, branching and fusing, form an almost continuous layer of bone. Toward the anterior extremity of the turbinate, the bone is replaced by cartilage.

The Mucous Membrane.—The earliest changes are seen in the epithelium of the mucous membrane which covers the turbinate bones. At first, scattered foci of damage are detected by the degeneration and desquamation of the epithelial cells. In these areas, infiltrating cells, chiefly large lymphocytes, appear. The cell infiltration is usually diffuse and very heavy, so that the stroma is literally packed with these cells in some cases. Only rarely are neutrophils present in large numbers, although they are frequently seen in the ducts of the glands, suggesting that infection entered here. It would, thus, appear that the infection penetrates the mucous membrane at a number of isolated points. Later, the damage to the epithelium becomes much more extensive, so that wide areas denuded of epithelium are seen. Although the infiltrating cells are present in large numbers throughout the stroma, only rarely are these cells seen beyond the outer fibrous layer of the periosteum and in the medullary spaces of the bone. Even in the final stages, the epithelial cells remain elongated or cuboidal rather than stratified squamous, as seen in primary atrophic rhinitis in man (ozena).

In the later stages of the disease, there is an increase in the tubulo-alveolar glands, and many are greatly distended with mucus, forming tiny cysts. Slowly, the fibrous tissue elements of the stroma proliferate, causing a marked increase in the density. This is apparent in the vascular layer where both the arterioles and veins appear to be surrounded by a zone of dense fibrous tissue.

The Blood Vessels.—In the early stages, no pathologic changes have been observed in the walls of the arterioles. In the terminal stage, when infection has existed for a long time and the bony tissue has largely disappeared, marked thickening of the arterial walls may be present, so that the lumen is greatly reduced, suggesting the presence of endarteritis. This has only been observed in advanced cases, and can not be considered as a cause for the atrophy of the bone.

The Periosteum and Bone.—Changes in the internal layer of the periosteum are frequently seen, even in the early stages of the disease. As it is from this layer that the osteoblasts arise, it is quite natural that with damage to the bone, even though this is almost imperceptible, the osteoblasts will proliferate in an attempt to repair the damage. In early cases, clusters of these still undifferentiated cells, having the appearance of young fibroblasts, may be seen lying between the periosteum and the bony plates of the concha. In advanced cases, these cells may be present in enormous numbers filling the spaces left by the disappearing bone. Although putting forth a heroic effort to rebuild the destroyed bone, this is never achieved, and nothing more than a few spicules are formed. It would almost appear as though there were some agent present in the tissue which prevented the final transformation of the juvenile osteoblasts into the adult cells capable of the bone formation. Proliferation is not prevented, but special function, *i.e.*, bone formation, ceases. The disappearance of the plates which form the skeleton of the turbinates is the most outstanding characteristic of the damage.

In the early stages, one notices here and there a slight decrease in the density of the bone which is well described as rarefication. This "fading out" or "resorption" of the bone may be in the center or at the border of the bony plaque. At first, it may be so slight that it is difficult to see unless the bony tissue is carefully searched for this defect. The presence of a group of proliferating periosteal cells is usually a good sign that damage is at hand.

As the disease progresses, more and more of the bony structure disappears. In some cases, the bone may entirely disappear, and nothing but a dense irregular band of fibrous tissue remains to mark the site of the vanished bone. The absence of a significant degree of inflammation in the medullary spaces and around the atrophying bone would suggest that the infectious agent does not attack the bony tissue directly. Another point of interest is the fact that in the majority of cases examined, osteoclasts were not seen as in most cases of rarefying osteitis. The exact cause of the atrophy and disappearance of the bone is not understood. It is undoubtedly directly related to the presence of the inflammation of the mucous membrane. A histopathologic examination reveals no evidence that nutrition or any secondary vascular change has significance in the resorption of the bone.

Discussion.—The direct cause of the resorption of the bony tissue of the turbinates is still undetermined. Inflammation of the turbinates in swine (rhinitis) is commonly seen, yet apart from this disease, severe atrophy is unknown. This points to the influence of a specific infectious agent. Observable vascular changes do not precede the disappearance of the bone, although they may follow the resorption. Some nutritional change is the most likely factor. The marked reduction in the depth of the bone is apparent. The loose connective tissue in the medullary area disappears and, with the removal of the earthy salts and the proliferation of the osteoblasts and fibrous tissue, a characteristic atrophy followed by an almost complete resorption of bone takes place. The disease described here should be designated infectious atrophic rhinitis.

BACTERIOLOGY

Since an important function of the mucous membrane lining the turbinate and ethmoid bones is the arrest of bacteria and foreign matter, a rich and varied normal flora can be expected. Radtke[13] isolated the following organisms from both normal and rhinitis-affected swine: Haemophilus, Micrococcus, Diplococcus, Streptococcus, Escherichia, Alkaligenes, Pasteurella, Actinomyces, Pseudomonas. Anaërobic cultivation was not made.

McKay[9] obtained the same organisms as Radtke from 31 healthy swine and from 75 affected with rhinitis; in addition, he isolated *Corynebacterium pyogenes* from the latter group. *Pasteurella multocida* and *Actinomyces necrophorus* were both present in 65 of the 75 affected swine examined by McKay. He believed that these two organisms may grow symbiotically, and that they may possess etiologic significance.

Phillips[10] isolated *C. pyogenes* from 90 per cent of the affected pigs he examined. While he believed that a filterable virus was the primary etiologic agent of rhinitis, he concluded that *C. pyogenes* was the most important secondary factor.

In summarizing their work on rhinitis, Gwatkin, Plummer, Byrne, and Walker[4] report that "results of bacteriological examinations did not suggest that the primary etiological factor was bacterial in nature."

In agreement with the majority of workers, the results of our bacteriologic examinations have not been helpful in determining the causative agent of rhinitis. The source of material has included cases of rhinitis in our routine diagnostic service, as well as experimental swine in transmission tests. Among the latter, we made a number of successive cultural examinations in the same pigs to determine whether certain organisms would become established during the course of the disease.

The variety of organisms obtained by us was similar to that recorded by others. No particular species of bacteria was isolated consistently.

THE SEARCH FOR A FILTERABLE VIRUS

Since no conclusive information was obtained by a bacteriologic examination, we considered the possibility of rhinitis being a virus infection.

First Filtrate Experiment.—The filtrate used in this experiment was prepared from the mucous membrane and turbinate bones of a pig showing typical evidence of rhinitis. The filtrate was instilled into the nostrils of 18 pigs in three litters. Five instillations were given from the third to the twenty-fourth day after birth. At varying intervals, pigs from this group were killed and examined. No evidence of rhinitis was found in any of these pigs.

Second Filtrate Experiment.—Believing that the failure of our first filtrate experiment may have been due to the selection of chronic cases as source material, we used early experimentally produced cases of the disease for the production of filtrate, in a

duplicate experiment. This should give a greater concentration of virus in the raw material if such is present. The technique followed was identical with that employed in the first experiment. Results were negative. Control pigs receiving unfiltered emulsion developed typical lesions.

SUMMARY

1) Our investigation has shown conclusively that the disease under discussion (atrophic rhinitis) is infectious although the causative agent is still undetermined.

2) Transmission occurs by contact or by instilling an emulsion of the damaged turbinate bones from early clinical cases of rhinitis, if pigs are exposed shortly after birth. The critical age of susceptibility has not been determined, but increasing age is associated with an increase in resistance.

3) Feces and urine from infected swine, when instilled into the nasal passage of piglets, have failed to reproduce the disease.

4) Atrophy of the turbinate bones is the most outstanding characteristic of the disease. This fact suggests the name infectious atrophic rhinitis. The manner by which this resorptive process takes place has not been elucidated. Osteoclasts, however, play little or no part in this resorption.

5) The infectious agent was not determined either by a bacteriologic examination or by a search for a filterable virus.

We thank Dr. C. E. VanRooyen and Dr. J. C. Crawley for their assistance in preparing the filtrates used in experiments dealing with the search for a filterable virus.

References

[1]Jones, T. L.: Rhinitis in Swine. Agric. Inst. Rev., *2*, (1947): 274-279.

[2]Doyle, L. P., Donham, C. R., and Hutchings, L. M.: Report on a Type of Rhinitis in Swine: J.A.V.M.A., *105*, (1944): 132-133.

[3]Duthie, R. C.: Rhinitis in Swine—1. Chronic Atrophic Rhinitis and Congenital Deformity of the Skull. Canad. J. Comp. Med., *11*, (1947): 250-259.

[4]Gwatkin, R., Plummer, P. J. G., Byrne, J. L., Walker, R. V. L.: Rhinitis in Swine—III. Transmission to Baby Pigs. Canad. J. Comp. Med., *13*, (1949): 15-28.

[5]Hjärre, A.: Personal communication.

[6]Hoflund, Sven: Report on Rhinitis Chronica Atrophicans in Swine, from a Clinical Viewpoint. Svenska Svin. Tidscrift., *9*, (1937): 206-220.

[7]Hutyra, F., and Marek, J.: Infectious Nasal Catarrh of Swine: Special Pathology and Therapeutics of the Diseases of Domestic Animals. Alex Eger, Chicago. p. 532.

[8]Jensen, C. O.: Sneezing Disease in Swine: Saertryk af Maanedsskrift for Dyrlaeger, *28*, (1916).

[9]McKay, A. K.: Ontario Veterinary College (Unpublished data).

[10]Phillips, C. E.: Infectious Rhinitis in Swine. Canad. J. Comp. Med., *10*, (1946): 33-41.

[11]Radtke, G.: Investigation Concerning the Cause and Nature of Rhinitis in Swine. Arch. F. Wissensch. prakt. Tierheilk., *72*, (1938): 371-423.

[12]Thunberg, E., and Carlstrom, B.: Sneezing Sickness in Swine from an Epizootoic Viewpoint. Skand. Vet. tidskr., *48*, (1940): 711-723.

DISCUSSION

DR. JOHN D. RAY (Nebraska): What do you recommend in a drove where this condition develops?

DR. T. L. JONES (Ontario): No specific treatment for rhinitis has been developed. The main weapon we have thus far is isolation.

I mentioned that the mortality is very low. As a matter of fact, the economic effect of the disease is largely that of increasing the period of finishing. In Canada, we produce Wiltshire sides for export, and the best Wiltshire side is produced from a pig at 200 lb. live weight, the pig being about 200 days of age. This 200-day period is increased when rhinitis is present in the herd. There may not be an increased feed intake, however, because rhinitis-infected pigs do not consume feed at the same rate as healthy pigs. The disease is of greatest concern to those who sell breeding stock.

It is important to realize that the disease cannot always be diagnosed by clinical examination alone. I have examined many heads of autopsy which appeared normal, yet the turbinate and ethmoturbinate bones had completely disappeared. It is, therefore, unwise to obtain breeding or other stock from infected premises, no matter how healthy the pigs appear.

The main point in control is isolation from contact with infected pigs during the nursing period. This provides reasonable assurance that the period of susceptibility is past.

Complete hog depopulation has been practiced by many, but the sacrifice involved does not appear necessary in controlling the disease, in the average outbreak.

Trypanosome Resistance to Antrycide

Trials with antrycide, the new antitrypanosomiasis formula developed in England to protect and treat domestic animals in tsetse fly-infected tropical regions (the JOURNAL, May, 1949:325), indicate that the brilliant future planned for this drug may be marred by drug-resistant strains of *Trypanosoma congolense* and *Trypanosoma vivax*. A report by S. G. Wilson, chief veterinary research officer at Entebbe, Uganda (*Vet. Rec.*, July 9, 1949) is the basis for this commentary.

The chance that larger doses of antrycide would solve the problem is eclipsed by the drug's toxicity at higher levels. [And so another miracle drug falls short of early predictions.—ED.]

Potassium monofluoroacetate is a heart poison and probably affects the cardiac conducting mechanism, thus leading to partial or complete heart-block, according to the work of Quin and Clark (*Onderstepoort J.*, 22, *Nov.*, 1947; 77-90).

Treating Field and Laboratory Cases of Anaplasmosis with Antimalarial Drugs

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ANAPLASMOSIS has probably existed among cattle in the United States for more than sixty years. It is a worldwide problem for the cattle industry, though little is known about its extent in many countries. This can be attributed largely to the insidious nature of the disease. In the United States, it has been diagnosed in 29 or 30 states and probably exists unidentified in several others. It is particularly serious in the southern states. In Oklahoma, alone, the losses may amount to $1,000,000, or more, per year. Its spread in Oklahoma has continued since Stiles[7] diagnosed the first cases near Ponca City in 1927.

Research workers have been tireless in their study of this baffling disease, but little positive information is available relative to diagnosis, specific treatment, and prevention.

REVIEW OF LITERATURE

Theiler[9] proved that anaplasmosis was a specific disease of cattle caused by a protozoan parasite. Because it usually occupied a position near the margin of the erythrocyte, he named it *Anaplasma marginale*. Darlington,[6] in 1926, probably reported the first pure cases of anaplasmosis in the United States among cattle in southeastern Kansas. Boynton[3] has furnished the most complete knowledge of the disease in this country. His research dates from 1915, when he studied it in the Philippines. Boynton[5] stated that it exists in four forms: mild, acute, peracute, and chronic.

Since the causative agent has been accepted as a protozoan parasite of the blood stream, drugs thought to be efficacious against parasites in this tissue have been used extensively through the years in the treatment of anaplasmosis, with varying degrees of success.

Since 1944, antimalarial drugs have been used extensively in treating avian malaria. Curd, Davey, and Rose,[4] in conducting early studies with this disease, were successful in developing paludrine 4888, an antimalarial substance which had a pronounced action on different types of Plasmodium organisms which cause avian malaria. Furthermore, the antimalarial substance, paludrine, was found to have a pronounced action on exo-erythrocytic forms of the parasite. This observation called for a closer study of the detrimental activity of the drug. Paludrine was found to be superior in its antimalarial activity against developmental forms of Plasmodium organisms as they appeared in birds. This suggested that it might be a therapeutic agent in the successful treatment of different types of human malaria.

Adams *et al.*[1] determined the therapeutic action of paludrine on 147 cases of benign tertian malaria and found no serious side effects following oral administration in doses ranging from 12 to 700 mg. at 12-hour intervals for fourteen to twenty-eight days. Following this success, Maegraith *et al.*[8] tried the effectiveness of paludrine on malignant tertian malaria. The fever was reduced, the clinical condition of the patient was improved, and asexual parasites disappeared from the blood. Oral administration was used in all these cases. These workers were equally successful in treating malignant and benign tertian malaria. Doses of 4 Gm., administered orally at 24- to 48-hour intervals, were most satisfactory.

The research workers who used paludrine and other antimalarial substances were fortunate in that asexual and sexual cycles were present, thus providing the benefit of microscopic observations as a guide to their efforts. No developmental cycle of Anaplasma has been observed within the blood tissue of cattle. Also, there is lack of definite proof that *A. marginale* is a protozoan parasite or that it is more than the accepted causative agent. Neither has a developmental cycle of *A. marginale* been demonstrated in culture mediums nor within the body tissues of the known biologic vectors, such as ticks. Horseflies (Tabanidae) and other vectors have been equally refractory in revealing developmental forms of Anaplasma. In combating anaplasmosis, knowledge of clinical observation and of the blood picture is limited. Therefore, it is necessary to use large numbers of cattle in testing the efficiency of therapeutic agents. Furthermore, an apparently wide variation in the way cattle react to anaplasmosis makes it necessary to take age and condition into consideration when testing the efficiency of the drugs.

From the Veterinary Research Institute, Oklahoma A. & M. College, Stillwater.

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METHODS AND MATERIALS

The Oklahoma Veterinary Research Institute was organized July 1, 1945, to conduct research on diseases of Oklahoma livestock. Anaplasmosis was believed to be of first importance. Extensive facilities were set up at the Oklahoma A. & M. College, and a large field laboratory was established in Osage County, the center of some of the best grazing land in the Southwest and the area where anaplasmosis has been recognized continuously since its diagnosis in 1927. An abundance of materials and equipment has been provided to facilitate these studies. Approximately 25 drugs have been used during the past three years; however, only those substances regarded as antimalarials will be discussed at this time.

EXPERIMENTAL PROCEDURE

Most of the cows used in these studies were purchased in Osage County, where anaplasmosis is prevalent among the 100,000 cattle maintained in that area. All others probably originated in Oklahoma. Animals ranged in age from 2 to 9 years; a few were aged. Splenectomized calves were not used in these studies, because this type of animal is not normal and, therefore, could not possess normal defense processes.

For convenience and accuracy, all cattle used in laboratory study were held for thirty days prior to being infected by subcutaneous or intravenous inoculation with virulent blood. During this thirty-day period, three preinjection observations were made, including temperature, pulse, respiration, hemoglobin determination, red blood count (r.b.c.), and presence of Anaplasma-like bodies. This precaution was taken to avoid the error made by individuals who, on observing a few bodies in red blood cells that they can not differentiate from *A. marginale*, treat, with gratifying results, animals that do not have anaplasmosis. It is easy to make such a mistake when treating large numbers of cattle under range conditions.

Beginning ten days after inoculation, clinical observations of the cattle were made at one- and two-day intervals and blood smears were examined from each animal. In no case was medicinal treatment started until Anaplasma bodies were observed in sufficient numbers to determine beginning developmental stages of anaplasmosis. Other cattle were allowed to advance further in infection in order to study the effects of the drug on Anaplasma organisms, and to observe pathologic changes in the blood picture that might deviate from those in the nontreated animals. Since little is known about Anaplasma and its behavior in the blood stream, it is not possible to determine the efficiency of chemotherapy in anaplasmosis without observing the blood picture throughout the course of the disease.

Mapharsen (Parke, Davis & Company).—Four cows, 3 to 5 years of age, in beginning stages of anaplasmosis were given 1.0 to 1.5 Gm. of mapharsen intravenously. Three of the 4 died after running a typical course of infection. "Carrier" infection was not destroyed, and the surviving animal made a slow recovery.

Clorarsen (Parke, Davis & Company).—Five cows, 4 to 7 years old, were given, intravenously, 0.9 to 1.5 Gm. of clorarsen in 200 cc. of distilled water. The injections were made at 24- and 48-hour intervals. The course of the disease was not altered. Four died and 1 recovered.

*Chloro-quinoline** (Parke, Davis & Company).—This substance was administered intravenously with 100 cc. of distilled water in 1½-Gm. doses to 7 cows with anaplasmosis. The cows were 2 to 5 years old, and the injections were made at 24-hour intervals. Two animals received two doses each and the other 5 received one dose each. Three died and 4 recovered. Three of the recoveries were in the 2-year age group. This drug, as used in these tests, proved unsatisfactory. Carrier infection was not destroyed.

Paludrine (Du Pont).—Twenty head of anaplasmosis-infected cattle, from 3 to 8 years of age, have been treated orally and intravenously with paludrine hydrochloride and the acetate form of this product. Doses of 0.2 to 4 Gm. were administered at 24- and 48-hour intervals over a period of two to seven days. All cattle were treated under laboratory conditions, and complete information was recorded during the course of the disease. It was noted that, when paludrine was administered early in the course of the disease, the cattle recovered. Oral administration of paludrine has been discontinued in favor of the more soluble acetate form which apparently gives better results when administered intravenously. Four grams dissolved in 100 cc. of distilled water and administered intravenously in two doses at 24- and 48-hour intervals produced the best results. There was 85 per cent recovery in all cattle treated with paludrine.

Quinoline Diphosphate† (DuPont).—This drug was used intravenously in treating active cases of anaplasmosis, some produced at the laboratory and others diagnosed in the field. Doses ranging from 200 to 2,500 mg. were administered intravenously at 24-

*4-(3'-N-piperidylmethyl-4'-hydroxyanilino)-7-chloro-quinoline.

†S.N. 7618-5 (7-chloro-4-(4'-diethylamino-1'-methylbutylamino)-quinoline diphosphate.

and 48-hour intervals to 49 field, and 46 laboratory, cases. The 400-mg. dose produced the best results. The diseased cattle varied in age from 2 to 12 years. No losses have been observed in the 2-year-olds. The recovery rate of the older animals, when treated with this product, was as great as that among the 3-to-5-year-olds. This product is nontoxic, and the greater dosage did not produce undesirable effects. The same records were made of field cases as were made of laboratory cases, with the exception that only one preinjection observation was made. Also, it was not convenient to make 24- and 48-hour observations in all field cases. However, this was accomplished with approximately 50 per cent of the animals treated.

Most field cases of the disease were not called to our attention until the r.b.c. had dropped below 3,000,000 per cubic millimeter. The veterinarian usually is not called to treat a field case of anaplasmosis until the r.b.c. has dropped to this level. Quinoline diphosphate was used on the greater number of cases, and it gave the best results. On this basis, this product can be administered later in the course of the disease, when the veterinarian has been called.

Aralen Diphosphate (Winthrop-Stearns, Inc.).—This product apparently has the same chemical formula as quinoline diphosphate. Recently, 3 cows and 6 heifers, between the ages of 2 and 5 years, have been treated intravenously with 400 to 900 mg. of aralen diphosphate in two doses at 48-hour intervals. These animals were treated under laboratory conditions, and it was found that they responded in the same manner as those treated with quinoline diphosphate. This product has been prepared commercially in aqueous solution for intravenous use. There was 100 per cent recovery of the 9 animals treated. This product will be used on additional laboratory and field cases of the disease before making a final report.

CONCLUSION

All laboratory cases that were treated with antimalarial drugs were checked by animal inoculation to determine whether carrier infection was destroyed. The first 3 animals were checked individually for carrier infection, and the remainder were tested in groups of 5 and 10. Carrier infection was not destroyed or noticeably affected. The three antimalarials, paludrine, quinoline diphosphate, and aralen diphosphate, showed more promise than any of the other drugs used to date. To successfully combat this disease, the drug should abruptly stop the cycle of infection within the animal and also destroy carrier infection without interfering with the active immunity produced. Such a product is not available at this time.

It is not suggested that the antimalarial drugs used in these studies will be the decisive therapeutic agents of choice in successfully controlling active cases of anaplasmosis, but there is a definite response in cases of acute infections following the administration of paludrine, quinoline diphosphate, and aralen diphosphate. The cycle of infection is apparently shortened, and this is desirable in treating any animal disease.

Attempts to Attenuate Anaplasma Marginale or Interrupt Infections.—Large doses of quinoline diphosphate were administered intravenously to a 5-year-old cow to prevent or check the disease and attenuate the infection. Although the injections were started two days after the animal had received a 170-cc. injection of anaplasmosis-infected blood, the incubation period was unchanged, and the cow developed typical anaplasmosis nineteen days after receiving the virulent blood. Although this product does not prohibit development of the disease or attenuate the infection when experimentally induced, it aids in recovery of the animal by shortening the course of the disease.

SUMMARY

Six antimalarial drugs were tested as treatment for cattle suffering from anaplasmosis. In some cases, range animals suffering from anaplasmosis contracted in the pasture were treated. For laboratory animals, a complete blood picture was available from samples taken at weekly intervals prior to inoculation with virulent blood, and blood samples were also taken at 24- and 48-hour intervals after onset of the disease.

Of the 6 drugs used (mapharsen, clorarsen, chloro-quinoline, paludrine, quinoline diphosphate, and aralen diphosphate), quinoline diphosphate gave the best results when administered in the course of the disease, making it more suitable for use after a veterinarian has been called. Large doses of quinoline diphosphate given one animal after inoculation with virulent blood, but prior to development of the disease, failed to inhibit development of the disease or to attenuate the infection.

References

[1]Adams, A. R. D., Maegraith, B. G., King, J. D., Townsend, R. H., Davey, T. H., and Havard, R. E.: Studies on Synthetic Antimalarial Drugs XIII. Results of a Preliminary Investigation of the Therapeutic Action of 4888 (Paludrine) on Acute Attacks of Benign Tertian Malaria. Ann. Trop. Med. and Parasitol., *39*, (1945): 225.

[2]Boynton, W. H.: A Disease in Cattle in the

Philippine Islands Similar to that Caused by *Anaplasma Marginale* (Theiler), Philippine J. Sci., Sec. B., Tropical Medicine, *12*, (1917): 281-289.

[4]Boynton, W. H.: Further Observations on Anaplasmosis. Cornell Vet., *22*, (1932): 10-28.

[5]Curd, F. H. S., Davey, D. G., and Rose, F. L.: Studies on Synthetic Antimalarial Drugs X. Some Biguanide Derivatives as New Types of Antimalarial Substances with Both Therapeutic and Causal Prophylactic Activity. Ann. Trop. Med. and Parasitol., *39*, (1945): 208.

[6]Darlington, P. B.: Anaplasmosis in Cattle (Galziete) Found to Exist in Kansas. North Am. Vet., *7*, (1926): 39-41.

[7]Maegraith, B. G., Adams, A. R. D., King, J. D., Townsend, R. H., Davey, T. H., and Havard, R. E.: Studies on Synthetic Antimalarial Drugs XIV. Results of a Preliminary Investigation of the Therapeutic Action of 4888 (Paludrine) on Acute Attacks of Malignant Tertian Malaria. Ann. Trop. Med. and Parasitol., *39*, (1945): 232.

[8]Stiles, Geo. W.: Personal communication, 1945.

[9]Theiler, A.: *Anaplasma Marginale* (Gen. and Spec. Nov.) The Marginal Points in the Blood of Cattle Suffering from a Specific Disease. Rep. Gov. Vet. Bacteriologist. Transvaal, (1908-1909): 7-64.

The Liver Fluke (Amphimerus Pseudofelineus) from a Cat in Ohio

Since issuing the "Check List of Parasites of Domestic Animals in Ohio",[1] attention has been called to several parasites in Ohio that are not included in the list. The following is a report of liver flukes found in a cat in Ohio.

A 1-year-old female cat was brought to the Ohio State University veterinary clinic with the history of anorexia, considerable pain, especially when lying down, frequent coughing, and numerous swellings under the skin. The temperature was 104 F.

Physical, x-ray, and bacterial examinations revealed nothing of diagnostic value. Parasitologic examination of feces (using sodium nitrate flotation method) revealed large operculated ova which were identified as those of *Paragonimus westermanii*.

Euthanasia was performed and postmortem examination revealed dark yellow masses of fat tissue, involving the pectoral, abdominal, and inguinal regions. In the latter region, the masses were thickest and most numerous. This same type of tissue was found throughout the omentum. All the fat tissue in the remaining parts of the body had the same dark yellow color. This condition was diagnosed as fat necrosis by the veterinary pathology department upon histopathologic examination.

From the Department of Veterinary Parasitology, College of Veterinary Medicine, The Ohio State University, Columbus.

Two *Paragonimus westermanii* were found in the lungs. In the intestine, there were 2 male *Ancylostoma caninum*, and 1 *Dipylidium caninum* with several immature proglottids.

The liver appeared normal, but upon sectioning, 2 flukes were found in the bile ducts. One of the flukes was stained and identified as *Amphimerus pseudofelineus* (Ward 1901).[2] The stained slide was sent to Dr. G. Dikmans, Zoölogical Division of the U.S. Bureau of Animal Industry, who confirmed our identification.

This is the first report of the fluke, *A. pseudofelineus*, from Ohio. Dikmans[3] in his "Check List of the Internal and External Parasites in North America" reports the parasite from Nebraska, Iowa, Maryland, and Virginia. In the July, 1949, issue of the *Journal of the American Veterinary Medical Association*, Turk[4] reported a case of this fluke from a cat in Texas.—*F. R. Koutz, D.V.M., M. Sc., Columbus, Ohio.*

References:

[1]Koutz, F. R.: Check List of Parasites of Domestic Animals Reported in Ohio. The Ohio State University Press, 1949, 14 pages.

[2]Essex, E. H., and Bollman, J. L.: Parasitic Cirrhosis of the Liver in a Cat Infected with Opisthorchis Pseudofelineus and Metorchis Complexus. Am. J. Trop. Med., *10*, (1930):65-70.

[3]Dikmans, G.: Check List of the Internal and External Animal Parasites of Domestic Animals in North America. Am. J. Vet. Res., *6*, (1945):211-241.

[4]Turk, R. D.: Liver Flukes from a Cat. J.A.V.M.A., *105*, (1949):23.

Avian Pneumoencephalitis Vaccination in California

On the basis of controlled field trials, it was concluded that use of the vaccine is favorable for immunization of young chickens on farms on which the disease has occurred, and especially in poultry districts in which the disease is enzoötic. The results of vaccination of laying pullets were less favorable, because there was retardation of egg production and a mortality which in one flock reached 8 per cent. Because the infection can spread from vaccinated birds to nonvaccinated susceptible birds in adjoining pens, the vaccination of young birds on a farm in which there are susceptible laying birds must be considered hazardous. The vaccinated flock may remain a potential source of infection for as long as seven weeks.

The general conclusion is that there still remains some conjecture concerning the fixed properties of vaccine virus.—*J. R. Beach, D.V.M., California.*

Histoplasmosis in Dogs

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HISTOPLASMOSIS is a highly fatal disease of the reticuloendothelial system, marked by a slow, steady progression, and characterized frequently by an absence of noticeable external symptoms in the initial stages. The disease has been reported in man, dogs, rodents, and horse (1 case). DeMonbreun[1] first described canine histoplasmosis in 1939. Since that time, a dozen or more cases have been recorded in veterinary literature.

This disease was first described as a human syndrome by Darling,[2] in 1908. In his description, he stated that the disease was characterized by chronicity, emaciation, anemia, fever, and enlargement of the spleen. Cases observed since that time have indicated the disease to be of a more complex nature, especially when the fungus attacks two or more organs or systems.

Histoplasmosis exhibits about the same clinical manifestations in human beings as in dogs. This similarity in symptoms, coupled with the fact that the causative organisms from canine and human cases showed no distinguishable differences, leads us to think that the dog might be a source of human infection. Until such time as we have definite knowledge about the natural habitat of the organism and its means of spreading, histoplasmosis in dogs should be regarded as a public health problem.

This discussion will be based on the observation of 5 cases of canine histoplasmosis. Of these cases, 3 were seen in the veterinary hospital at Kansas State College, and 2 were diagnosed and observed by Dr. I. J. Twiehaus in his veterinary hospital in Kansas City, Mo.

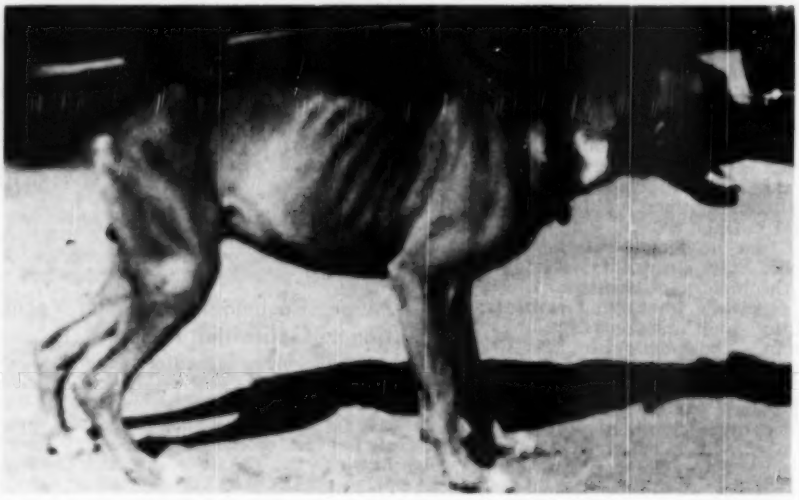

Fig. 1—One-year-old male Boxer affected with the systemic type of histoplasmosis. Note the fullness of the abdomen over the region of the liver.

One case was presented Dr. Twiehaus only once, but the other was of a chronic nature and was hospitalized in his clinic several times during the course of the disease. All diagnoses were made from clinical observation and history, followed by laboratory confirmation.

Histoplasmosis is caused by the fungus,

From the Department of Surgery and Medicine (Mosier), and the Department of Pathology (Barner), Kansas State College, Manhattan; and Jen-Sal Laboratories (Davis), Kansas City, Mo. Dr. Mosier is now at the University of Illinois College of Veterinary Medicine, Urbana.

Histoplasma capsulatum. The fungus has not been found in nature, and its natural habitat is as yet undetermined. The organism appears in the cells of the affected tissue as a small (1 to 5 μ) oval body consisting of a dark nucleus surrounded by a

Fig. 2—X-ray of lung showing small nodules caused by Histoplasma infection.

thick, colorless capsule. The organism may be cultured on Sabouraud's medium by inoculating and holding at room temperature for about two weeks; or on blood agar incubated at 37 C. (99 F.). Due to the rather pathognomonic involvement of the mesenteric lymph glands, we assume that the organism enters the body by way of the digestive tract. In 2 of our cases, we observed involvement of the respiratory tract, evidently as a metastasis from the mesenteric lymph glands rather than a primary infection. In these 2 cases, we cultured the organism from the blood, thereby supporting the metastasis theory.

Nevertheless, the possibility that histoplasmosis is an air-borne disease, and may gain entrance through the respiratory tract, should not be overlooked. This possibility is supported by the cases of primary histoplasmosis of the lungs that have been diagnosed in human medicine.

SYMPTOMS

Histoplasmosis in dogs develops slowly; usually one to nine months will elapse between the time the owner first notices that the animal is losing weight and the time of death. Probably, the interval from the actual entry of the infective fungi into the body until time of death is even longer. In 1 case, the infection may have required a year to run its course.

The onset of the disease is usually characterized by digestive upsets, intermittent diarrhea, dry hacking cough, and irregular fever. During this time, there may be a gradual loss of weight; however, in some cases the animal may not show any appreciable loss until some weeks later. If there is a concurrent infection of hookworms, these symptoms could be falsely attributed to their presence. However, if the patient fails to respond to worming, the possibility of histoplasmosis should be considered, particularly if the animal continues to go "down hill."

The symptomatology will depend upon the extent of tissue involvement. We have observed two distinct sets of symptoms that appear characteristic of the disease.

Mesenteric Form.—This type of histoplasmosis is characterized by ascites, emaciation, and digestive upsets. The manifestations of this form are due to the effects of the fungus

Fig. 3—Histoplasma cultures on Sabouraud's medium. The right tube contains the peripheral blood. The tube on the left is a pure culture.

on the mesenteric lymph glands. There is an enlargement of these glands and, in most cases, they are easily palpated through the abdominal wall. The ascites may be attributed to mechanical blockage of the mesenteric lymph vessels by a proliferation of the lymphoid tissue. Usually, a laparotomy is indicated to determine definitely if the blockage is due to a neoplasm or to proliferation of lymphoid tissue. The digestive upsets occur as the result of a thickening of the intestinal wall due to chronic catarrhal enteritis.

Systemic Form.—This type of histoplasmosis is characterized by an enlargement of the liver, spleen, and all palpable lymph glands. There is an irregular fever, and

the animal is extremely emaciated, despite excellent appetite. X-rays of the chest cavity may reveal scattered nodules throughout the lung tissue, resembling tuberculosis. Smears of the peripheral blood, stained with Giemsa's, Kingsley's, or Wright's stain, should be examined. The organism may be demonstrated in the large mononuclear cells

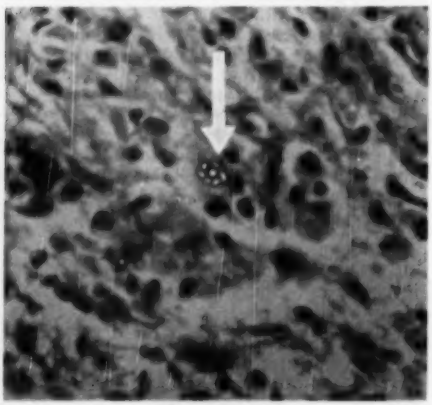

Fig. 4—The organism Histoplasma capsulatum in tissue section of lymph gland.

of the blood. Biopsy of the enlarged lymph glands may be performed, and the tissue cells examined for *H. capsulatum*. The organism can be cultured from the lymph glands and blood.

The patient may start vomiting and showing icterus two or three days before death. Ulcers may form in the mouth and the animal will suddenly appear to be very depressed.

AUTOPSY

The lesions found on necropsy will depend on the form of the disease present. In the mesenteric form, a large mass of lymphoid tissue is usually found in the abdominal cavity. The intestines are thickened and a catarrhal enteritis is present. There is usually a considerable amount of fluid in the peritoneal cavity.

In the systemic form, gross lesions are numerous. The liver and spleen may be twice their normal size. Enlargement of the lymph glands, and icterus, are common. Ulcers of the mouth and intestines may be found. Small nodules may or may not be seen in the lungs.

Microscopic examination will reveal the organism in the macrophages of the affected tissue, but only after prolonged microscopic search in many cases. The organisms may be found in any tissue except bone and cartilage. The affected areas frequently show central necrosis surrounded by capillaries, fibroblasts, monocytes, lymphocytes, and parasitized macrophages. Differential diagnosis from the standpoint of pathology should include tuberculosis, leucemia, and malignant neoplasms.

MISCELLANEOUS

Investigators are testing the value of an allergic skin test which consists of injecting 0.1 cc. of histoplasmin intradermally and reading the test at forty-eight hours and again at seventy-two hours. A characteristic, reddened, indurated wheal is considered a positive reaction.

Treatment of histoplasmosis has been unsuccessful. Various substances such as fuadin, crude liver, potassium iodide, antibiotics, and sulfonamides have been used to no avail.

TABLE I—Cases of Histoplasmosis

Description of animal	History	Symptoms	Diagnosis
F. Boxer 2 years 1948	Gradual loss of weight despite normal appetite. Intermittent, hacking cough for 12 mo. Intermittent diarrhea.	Temp. 104 F. Labored breathing. Chronic cough. Enlarged liver. During last week, icterus developed and grew rapidly worse. Enlarged lymph nodes.	Histoplasmosis. Confirmed on autopsy by finding Histoplasma organisms in affected tissues upon sectioning.
M. Boxer 1 year 1948	Gradual loss of weight despite normal appetite. Intermittent diarrhea over a period of 6 mo. Occasional rise in temp. which responded to penicillin.	Temp. 104.3 F. Enlarged lymph nodes. Liver greatly enlarged. Diarrhea. X-ray of chest revealed small nodules in lung tissue. Ulcers of the tongue appeared 2 days before death. Vomiting commenced at this time.	Histoplasmosis. Organism found in monocytes of peripheral blood smears. Biopsy of precapular lymph node revealed Histoplasma. Organism cultured from blood.
F. Cocker 3 years 1948	Gradual loss of weight. Distention of the abdomen. Chronic diarrhea. Animal listless and appetite poor.	Temp. 103.4 F. Ascites. Large mass of tissue in the median plane just anterior to the kidneys.	Laparotomy revealed the mass to be an enlarged lymph gland. Histoplasma organisms found on sectioning.
F. Mong. Collie 2 years 1945	Gradual loss of weight. Distention of the abdomen. Chronic diarrhea.	Temp. 103.8 F. Ascites. Large mass of tissue palpable in abdominal cavity.	Neoplasm. Tissue section following death revealed Histoplasma organism in lymph tissue of the greatly enlarged mesenteric lymph gland.

SUMMARY

The following conclusions are the result of studies made on 5 cases of histoplasmosis in dogs.

1) Histoplasmosis is highly fatal.

2) Two distinct syndromes may occur:
   a) Mesenteric.
   b) Systemic.

3) Demonstration of the organism in the affected tissue is the only positive diagnosis.

4) Lesions found on autopsy are fairly characteristic; however, they must be differentiated from lesions of tuberculosis, leucemia, toxoplasmosis, and malignant neoplasms.

5) Treatment is unsuccessful.

References

[1]DeMonbreun, W. A.: The Dog as a Natural Host for Histoplasma Capsulatum. Am. J. Trop. Med., *19*, (1939): 565.

[2]Darling, S. T.: Histoplasmosis; A Fatal Infectious Disease Resembling Kala-Azar Found Among the Natives of Tropical America. Arch. Int. Med., *2*, (1908): 107.

Tetanus in a Young Dog

Although tetanus is relatively uncommon in dogs, 3 cases were presented to my hospital during the past summer. The one to be described was most typical of the 3 and was additionally interesting because of the use of d-tubocurarine chloride as part of the treatment.

On Sept. 6, 1949, a 4-month-old German Shepherd, weighing 26 lb., was presented. It was unable to open its mouth and there was wrinkling of the skin on the head between the ears. The owner had noticed a laceration the week before on the inside of the mouth. The animal was admitted, and the very next day was walking with a stiff gait. Penicillin, 300,000 units, was administered every day of the fifteen days the animal was hospitalized. Tetanus antitoxin, 50,000 units, was given intraperitoneally on the second, third, and fourth days. On the third day, the animal's legs were perfectly rigid. It could not rise, but could manage a few steps when put on its feet. The angles of the mouth were drawn back, and the tail stood straight from the back. The dog recognized all commands and could wag its tail at all times, although this seemed to be quite an effort. All this time, it was nourished by injections of saline, glucose, rubramin (B_{12}), twice weekly, and multivitamins.

On the fourth day, d-tubocurarine chloride was obtained, and 0.5 cc. was given intramuscularly (3 mg./cc.). Chloral hydrate crystals, which had been given in capsules per rectum, 15 gr. per capsule, were stopped. The relaxing effect compared with chloral was remarkable. In fact, the patient was able to take food by mouth following these injections. They were never repeated at less than 24-hour intervals and always given intramuscularly. The dosage was increased until it was found that 1.25 cc. gave the best results. About the fifth day, both ears stood up so rigidly they appeared to be pasted together.

By the twelfth day, the patient was normal in all respects, except for the wrinkling of the skin on the head and the standing of the ears, both of which persisted for two weeks after discharge.—*Jerome H. Ripps, D.V.M., Asbury Park, N. J.*

The veterinarian usually exposes his knowledge—or lack of it—in his approach to a horse, in walking to the stable, and even when he is among people who are versed in breeding and qualifications of horses. There are things the veterinarian should be able to do and things which he should not do.—*A. F. Wempe, D.V.M., Kansas.*

Extension Veterinarians.—Extension specialists in veterinary medicine correlate and integrate their work with the services of the local veterinarians and livestock specialists, in order to carry the results of research to the livestock owners and to develop and formulate plans for preventing and reducing livestock losses caused by disease.—*From the Report of Dean C. S. Bryan, School of Veterinary Medicine, to the President of Michigan State College,* 1948.

Amphotrophin in Hard Pad Disease of Dogs.—Two cases of hard pad disease that responded to amphotrophin (hexamine camphorate—Bayer) after failing to respond to various other treatments are described by J. C. Greatorex, of the Royal Veterinary College, London (*Vet. Rec.*, July 9, 1949). Why and how amphotrophin may influence the course of hard pad disease was not determined.

Livestock farming, with utilization of grass and pasture, is becoming more general throughout the south as a result of a definite shift in the type of farming. Simultaneously, health problems are changing, because permanent pastures perpetuate parasites. Pasture management and rotation have become increasingly important as measures for disease prevention.—*F. S. Chance, B.S., Tennessee.*

Mastitis Control Program
of the Florida State Live Stock Sanitary Board

A. A. McMURRAY, D.V.M.
Lakeland, Florida

THE FLORIDA State Live Stock Sanitary Board has a program for the detection, control, prevention, and elimination of mastitis in dairy cattle. It is a practical program which can be adapted to conditions of any dairy herd, because it is based on good herd management and correct milking practices, supplemented with professional treatment when indicated. This program was launched on Sept. 1, 1948, under the general supervision of the state veterinarian, Dr. J. V. Knapp.

The personnel directly responsible for the execution of this program are the director and a bacteriologist at the headquarters, and five district supervisors stationed throughout the state. These field workers are men with dairy background, who had their college training in dairying at recognized agricultural colleges. After these men were employed and given an intensive course in the technique of collecting laboratory samples of milk and in the care of the udder of the cow, they were stationed in the major dairy sections of the state, where they are now working with coöperative dairymen on mastitis problems.

ROLE OF HERDSMAN IN MASTITIS CONTROL PROGRAM

Based on many years experience, it is the opinion of our Board that the solution to the mastitis problem is found through good herdsmanship. Great emphasis is, therefore, placed on giving the herdsman all information at our command on this disease, such as: definition, prevalence, causes, how it enters the herd, how it enters the udder, symptoms, and how to detect, prevent, control, and eliminate it.

The dairyman or herdsman is taught that this disease is an inflammation of the udder, and that it is found wherever dairy cows are kept. As to its causes, we recognize that injury, either mechanical, thermal, or chemical, occurs before infection takes place. Furthermore, we recognize four phases leading to mastitis, namely:

1) invasion by the mastitic organisms;
2) injury to the protective membrane of the teats or udder;
3) infection, after which follows,
4) inflammation.

I repeat, the four phases which lead to mastitis are: invasion, injury, infection, and inflammation.

We feel that too much stress cannot be placed on the importance of a well-informed herdsman in a mastitis control program. For this reason, he is given all the information we have in the practical fundamentals of good herd management and correct milking practices. The following are some of the general recommendations given herdsmen on precautionary measures and treatments:

1) Practice good sanitation.
2) Dry off cows properly.
3) Feed a balanced ration.
4) Have herd examined periodically.
5) Use strip cup daily.
6) *Prevent injuries.* This is so important that if we could prevent all injuries the mastitis problem would be solved.

In this connection, the herdsman is cautioned to:

a) observe udders and teats for injuries at each milking;
b) give first aid to minor injuries at once after they occur;
c) in case of acute inflammations, give first aid to any external injury, and milk out infected quarter hourly until it returns to normal;
d) do not open obstructed teats with teat tube;
e) establish correct milking practices.

In as much as the majority of injuries occur during the milking operation, considerable time is spent with each coöperating dairyman in establishing correct milking practices. The methods used are, in general, the same as those advocated by Dr. W. E. Petersen. In this connection, we have deviated from his method considerably in applying heat to the udder just prior to using the milking machine. We require our coöperating dairymen to provide a thermostatically controlled hot water heater placed as near to the milking stable as possible, preferably in the loft just above the center of the milking string. The water is

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Director, Mastitis Control Division, State Live Stock Sanitary Board, Lakeland, Fla.

heated to about 180 F. and then tempered down to 124 or 125 F. with a mixing valve. This water is carried to the cows' udders through a small hoze, on the end of which is a spray nozzle. The nozzle is held in the left hand, while a cloth is used in the right hand for washing the udder. After the udder has been thoroughly washed, the nozzle is dropped into a bucket, the cloth is wrung as dry as possible and the udder wiped and massaged with the opposite side of the cloth. One or two streams are then milked from each teat into the strip cup, and the machine attached within one minute after the udder has been prepared.

The advantage of this method over the bucket method, advocated by Dr. Petersen, is that by applying water of the same temperature to the cow's udder before each milking, she habitually lets her milk down more rapidly, thereby, protecting the udder against the prolonged use of the milking machine. Our coöperating dairymen have found that, by using this method, their milking time has been reduced as much as one-fifth to one-third of the original time required.

The procedure in carrying out our mastitis program is simple and practical. A dairyman requests our assistance. One of our men goes to his farm and examines the herd, using only the stable tests, thus showing the dairyman the number of abnormal udders found by this method. The dairyman is then advised as to the installation of hot water facilities. When he has complied with these requests, our man returns, shows the dairyman the correct milking procedures, puts the abnormal cows by themselves for hourly milking-out of infected quarters, and makes any other necessary changes in herd management. In about three weeks, our representative returns for a check-up on udder conditions and procedures in herd management and milking practices. Invariably, where there is a high incidence of infection (and there usually is), there is an improvement, provided the herdsman has carried out our recommendations. In another month or six weeks, a follow-up herd examination and general check-up are made. At this time, quarter samples are collected and sent to our laboratory in order to determine the types of infection in the herd.

We find that a correlation of field and laboratory results is essential in a successful mastitis program. This is needed in determining the best line of procedure in preventing, controlling, and eliminating mastitis.

The progress made to date in each herd has been in the same proportion as there has been coöperation of the herdsman. He cares for the animals in a general way, prevents injuries to the udders and gives aid to minor injuries, calls in qualified help in his feeding problems, and calls for the veterinarian when one is indicated. In every case, when the herdsman has been trained and given the responsibility of performing the duties of a skilled dairyman, he has discontinued the practice of "quackery," and he is bringing mastitis under control in his herd.

We maintain that a herdsman should be as well trained for his duties as the machinist, school teacher, lawyer, doctor, veterinarian, or nurse is trained in his respective field of endeavor. He is instructed to carry out general herdsmanship practices, but when it comes to specialized services, such as balancing feed rations and medication of major injuries and infections to the udder, he should call in qualified assistance. In every case where the veterinarian has coöperated with the herdsman by prescribing treatments and trusting the herdsman to administer them (the same as the nurse does in the medical profession), the results have justified this procedure. Furthermore, when this method is used, a more pleasant relationship exists between the herdsman and the veterinarian to the extent that both are greatly benefited.

As to the relationship between the practicing veterinarian and our district supervisors, we are glad to report that after the veterinarian learns that these supervisors teach the dairyman that mastitis is controlled through good herdsmanship and correct milking practices, supplemented with veterinary services, a pleasant relationship is also established. Many veterinarians have already advised dairymen to place their herds under our program.

After the basic work has been completed by our staff and the owner, the veterinarian can use the results of the stable test and laboratory findings as a guide in determining his approach to the disposal or treatment of the infected cows he is called in to see.

Florida's mastitis control program has not been operating long enough to have a definite working procedure established with the local veterinarians in all herds. But in those cases where the veterinarian has been called in for treatment of infected cows that do not respond to good herdsmanship, the results have been beneficial to the owner.

Up to this point, only the practical role played by the herdsman in our program has been dealt with. Now, I should like to mention a few technical aspects of our work

which are not discussed in detail with the dairymen.

Infective Organisms

Our findings do not agree with those who maintain that, "Although injuries predispose to mastitis, the stand that infectious agents cause mastitis in the absence of injuries is undeniable."

With reference to infective organisms, we have found that the most common bacteria occurring in the original acute inflammations are staphylococci, micrococci, the coliform organisms, and, occasionally, the Corynebacterium organisms. While in chronic mastitis, we find streptococci (with agalactiae predominating), staphylococci, and occasionally, Corynebacterium and coliform organisms. We have not found *Streptococcus agalactiae* in original acute attacks. However, this organism is common in acute flare-ups of chronic mastitis, where a mixed infection is frequently found. Since we find *Str. agalactiae* only in chronic mastitis, we wonder if this organism is capable of producing an infection in the udder, except in those cases where a medium for growth has been prepared by a previous acute inflammatory process.

While we do not know definitely how *Str. agalactiae* reaches the inflamed udder, it appears to be a secondary invader. At any rate, following acute inflammation, it is found in the greater number of infected udders, where it progressively replaces the original infective organisms.

The Florida State Live Stock Sanitary Board does not maintain that it has a complete solution to the mastitis problem. However, the fact remains, we are reducing this disease in coöperating herds to the extent that it is a minor, instead of a major, problem.

Conclusion

Before closing, I should like to recommend that this organization appoint a committee to make a thorough study of a more effective approach by the practicing veterinarian to the problem of mastitis in dairy cattle. It is generally conceded by dairymen and veterinarians that mastitis is one of the most, if not the most, serious economic problems in dairy herds. Yet, it is one of the most easily controlled of the major diseases among dairy cattle. The time for well-organized efforts in combating this disease by the veterinarian is far over-due. Dairymen throughout the nation are wondering why practicing veterinarians are not taking the lead in combating mastitis in dairy cattle.

Discussion

CHAIRMAN ERICKSON: We have time for a few questions.

DR. H. D. CARTER (Indiana): Why are dairy college graduates employed instead of veterinarians?

DR. McMURRAY: There are two reasons: one is that we could not employ from 8 to 10 veterinarians, if we wanted them. The other is that men who have been schooled in dairy colleges are more thoroughly trained in herd management than those trained in colleges of veterinary medicine.

Since this program is based on herd management, we feel that men from dairy colleges are better trained to execute a program based on herd management.

DR. GEO. R. BURCH (Indiana): Do any of these men treat at all? Do they use any type of udder infusion, along with the herd management program?

DR. McMURRAY: They positively do not. We endeavor to make professional herdsmen out of these fellows, so they in turn are able to train herdsmen. These fellows do not advocate any medication except as first aid to minor injuries. They do not try to replace the veterinarian. For instance, there are times when we feel a certain amount of palpation of the udder could be used to advantage, but, realizing the complications this might lead to, they are not permitted to even make any report on the physical condition of the udder. They do, however, report on the physical, chemical, and bacteriological properties of the milk.

DR. T. L. STEENERSON (Indiana): Have you ever practiced veterinary medicine? If so, what was your approach to this problem?

DR. McMURRAY: Yes, I have been a practicing veterinarian. My approach to the mastitis problem while practicing was essentially the same as it is in state work, with the exception that a professional fee for services rendered was charged.

A large percentage of my practice was that of mastitis in dairy cattle.

Streptomycin in Mastitis

Streptomycin was dissolved in sterile, distilled water at the rate of 1 Gm. of streptomycin per 100 cc. of water. This solution was infused into the mammary quarter in a single course of treatments varying from 1 and 1½ to 8½ Gm. per quarter. The single dose within the series was either ½ or 1 Gm.

Of 7 cows so treated, 3 that were affected with acute systemic mastitis caused by coliform organisms were not benefited by the treatment. This was true even though a total of 4 Gm. of streptomycin was injected. Multiple infusions of streptomycin totalling 4 Gm. per lactating quarter have failed to remove *Pseudomonas aeruginosa* from six quarters and *Staphylococcus aureus* from two quarters.—*O. W. Schalm, D.V.M., California, from "Streptomycin," by Dr. S. A. Waksman.*

Detection of Canine Histoplasmosis by Intradermal Histoplasmin Test

CLARENCE R. COLE, D.V.M., Ph.D., JOHN A. PRIOR, M.D., AND SAMUEL SASLAW, M.D., Ph.D.

Columbus, Ohio

IN THE literature through 1948, few of the reported cases of spontaneously occurring histoplasmosis in dogs were recognized clinically. With two exceptions,[1, 2] the disease was not discovered until necropsy. The diagnosis was established in 2 by culture only of the causative fungus, *Histoplasma capsulatum*;[3, 5] in 2, the organisms were demonstrated in the tissue as well as on culture;[1, 4] and in the remaining 8,[6-10] the organisms were seen in the characteristic histopathologic picture. It is the purpose of this paper to report 5 additional cases of canine histoplasmosis in which the diagnosis was established antemortem.* Four were detected by the histoplasmin skin test, subsequently confirmed by culture and biopsy, and the fifth by antemortem blood culture (table 1).

Not included in table 1 are: (1) a case report by Thuringer[10] which does not present findings in accord with a diagnosis of histoplasmosis, and (2) a reference in a commercial magazine, titled "Canine Histoplasmosis—Suspect" which does not list the author's name although *H. capsulatum* was cultured.

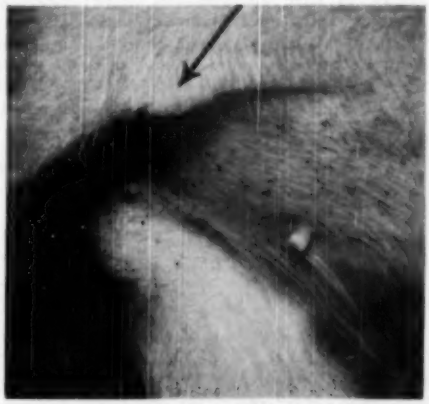
DeMonbreun[1] and Emmons *et al.*[10] have demonstrated that *H. capsulatum* recovered from dogs is morphologically and culturally identical to the organism causing histoplasmosis in man. The latter authors also have isolated *H. capsulatum* from a mouse and rats.

DeMonbreun[1] suggested that the dog might possibly transmit the infection to man and that fleas and ticks might play a part in the transmission of this disease. Since that time, others have suggested the dog as a possible source of the infection in man. Olson *et al.*[3] permitted ticks, *Dermacentor variabilis*, to feed on a dog proved by means of blood cultures to be ill with histoplasmosis. *H. capsulatum* was recovered in pure culture from these ticks soon after feeding. Pará[4] isolated *H. capsulatum* from the lung of a house dog which had been associated with a 19-month-old child who died of histoplasmosis.

For the following reasons, central Ohio seemed to be an excellent region to study histoplasmin skin reactivity in dogs:

1) It represents a region with a high incidence of histoplasmin reactors in man, many of whom have pulmonary calcifications but fail to react to tuberculin.

2) The endemic and enzoötic area of reported cases of histoplasmosis in man and dogs is the Midwest.



—*The Ohio State University*

Fig. 1—Right flank showing a positive histoplasmin reaction forty-eight hours after the injection of 0.1 cc. of 1:100 histoplasmin H-42. This typical reaction along the free edge of the skin fold is seen to consist of 10 mm. of edema. The erythema is not visible.

3) Dogs live in very close association with man.

4) *H. capsulatum* isolated from dogs is identical to the organism recovered from human cases of histoplasmosis.

MATERIALS AND METHODS

The skin test antigen, histoplasmin, is a filtrate

Chairman, Department of Veterinary Pathology, College of Veterinary Medicine, Ohio State University (Cole); associate professor, Department of Medicine, College of Medicine, Ohio State University, Columbus (Prior); and chief, Serologic Research Section, Department of Bacteriology, Army Medical Center, Washington, D. C. (Saslaw).

The coöperation and assistance of Drs. Morton, Cross, Catcott, Rudy, Redding, Knapp, Kintner, and Miss Torbet are greatly appreciated.

*Since this manuscript was submitted, Dr. D. R. Cordy (Cornell Vet. *39*, 1949:339-344) has reported 1 case of canine histoplasmosis recognized postmortem.

of broth cultures of *H. capsulatum* which is the causative agent of histoplasmosis. Histoplasmin lot H-15 was used in a dilution of 1:1,000 in the first 643 dogs. Thereafter, histoplasmin lot H-42 was used for testing 671 dogs. A dilution of 1:100 of H-42 corresponded in antigenicity to the 1:1,000 dilution of H-15. In addition, a number of animals were tested simultaneously with 1:10 dilution of H-42. The antigen (0.1 cc.) was injected intracutaneously in the almost hair-free medial aspect of the flank skin fold. The test was interpreted after forty-eight hours and the presence of edema measuring 5 mm. or more in diameter was considered to be a positive reaction. All dogs were simultaneously tested with intradermal tuberculin (P.P.D.) using 0.1 cc. containing 0.001 mg. in the opposite flank. This amount was used since it was the conclusion of Mills and Colwell[10] that it represented the optimum dosage for the determination of tuberculin sensitivity in dogs.

Dogs showing positive histoplasmin tests were subsequently studied, when possible, by biopsy, histopathology, culture of circulating blood, sputum, tissues and urine, animal inoculation, radiograms, and blood counts. A thorough search was made for pathogenic agents other than *H. capsulatum*. All dogs reacting to histoplasmin, and subsequently shown to have histoplasmosis, were repeatedly tested to determine the optimum dosage.

The dogs tested, almost all of which came from central Ohio, were routine admissions to the veterinary clinic, College of Veterinary Medicine, Ohio State University. A total of 1,314 dogs was tested. There was no selection made as to age, sex, breed, or disease condition.

RESULTS

A total of 1,314 dogs was tested with histoplasmin, of which 7 gave a positive reaction. None of those reacting to histoplasmin reacted to tuberculin. A single test of 1:1,000 dilution of H-15 was given to 643 animals, 2 of which had positive reactions. One showed edema and erythema 5 mm. in diameter, and the other was 19 mm. in diameter. This latter reaction was characterized by marked erythema and central necrosis. A 1:100 dilution of H-42 histoplasmin was given to 671 animals, 5 of which reacted. The reactions in these dogs ranged from 7 to 16 mm. of edema at forty-eight hours. This reaction was accompanied by varying amounts of surrounding erythema. Although the reaction is easily seen and palpated forty-eight hours after injection, it is equally apparent at seventy-two hours, after which it slowly recedes.

The first animal having a positive histoplasmin reaction showed chronic cough, loss of weight and strength, rough coat, and some gastrointestinal disturbances. This animal suffered from a slowly progressive debilitating illness lasting about five months. It died two months after hospitalization. However, no further studies were possible during this interval or on postmortem. The

TABLE 1—Published Reports of Naturally Occurring Canine Histoplasmosis

Date	Author	Breed	Age	Sex	Habitat	Basis of diagnosis
1939	DeMonbreun, W. A.[1]	Boston Terrier	5 yr.	M	Tennessee	a b
1944	Callahan, W. P., Jr.[3]	Springer Spaniel	7 yr.	F	Missouri	a
1945	Parsons, R. J. and Everett, M.[4]	Beagle	?	F	Michigan	a
1945	Birge, R. F. and Riser, W. H.[5]	Pekingese	4 yr.	M	Iowa	a
		Boston Terrier	5 yr.	M	Iowa	a
1945	Tomlinson, W. J. and Grocott, R. G.[6]	Springer Spaniel	6 yr.	F	Canal Zone	a
1946	Pará[7], M.[8]	Mongrel	?	?	Brazil	a b
1946	Seibold, H. R.[2]	Pit Bull Terrier	2 ½ yr.	M	Virginia	a
		Pit Bull Terrier	18 mo.	F	Virginia	b
1947	Olson, B. J., Bell, J. A. and Emmons, C. W.[9]	Pit Bull Terrier	18 mo.	M	Virginia	b
1948	Harmon, K. S.[10]	Fox Terrier	14 mo.	M	Missouri	a
		Fox Terrier	25 mo.	M	Missouri	a
1949	Prior, J. A., Cole, C. R. and Torbet, V.[11]	Fox Terrier	2 ½ yr.	M	Ohio	a b c
		Springer Spaniel	2 ½ yr.	M	Ohio	a c
		English Sheepdog	1 yr.	F	Ohio	a b c
		Boxer	6 mo.	F	Ohio	a b
1949	Cole, C. R., Prior, J. A., and S. Saslaw (reported herein)	Cocker Spaniel	2 yr.	M	Ohio	a b c

a = Microscopic demonstration of organisms in the tissues. b = Culture of *Histoplasma capsulatum*. c = Positive histoplasmin skin test reaction.

second, third, and fourth dogs showed respiratory signs of a similar nature as the outstanding clinical manifestation; 2 of these periodically showed blood in the feces, diarrhea, and anorexia. The last 3 dogs reacting to histoplasmin were apparently asymptomatic.

Exploratory laparotomy was performed on 6 of the 7 dogs reacting to histoplasmin. Biopsy of spleen, liver, and mesenteric lymph nodes was made for culture and histopathologic study. Pure culture of *H. capsulatum* was obtained from 3, and in all 3, typical organisms were demonstrated microscopically in the lesions. The fourth showed the presence of the fungus in the characteristic lesions, but *H. capsulatum* was not recovered on culture. In those cultured, the organisms were found in the spleen of 1 (positive to H-15), the liver of 1, and the spleen, lung, and liver of another (both positive to H-42).

Radiograms were taken of the lungs of 6 of the dogs reacting to histoplasmin. All showed the presence of nodular lesions throughout the lung; a few also showed the presence of calcium.

A thoracotomy was performed on all of the above animals to excise a pulmonary nodule for culture and microscopic study. *H. capsulatum* was recovered in pure culture as well as demonstrated in the pulmonary lesions from 1 animal. The organism was not recovered from the others. However, in 1 negative on culture, the organisms were demonstrated microscopically in the pulmonary lesions.

A 6-month-old female Boxer with acute histoplasmosis was tested with histoplasmin on two occasions, fifteen days apart, and failed to react. It showed progressive emaciation with anorexia, anemia, icterus, oral submucosal hemorrhages, splenomegaly, hepatomegaly, and enlargement of the abdomen due to ascites. The diagnosis was established antemortem by culture of *H. capsulatum* from the blood. Cultures taken at necropsy yielded *H. capsulatum* in pure culture from liver, spleen, kidney, lung, ascitic fluid and splenic, gastric, mediastinal, and renal lymph nodes. It has been a frequent observation that human patients acutely or terminally ill with histoplasmosis fail to react to histoplasmin.

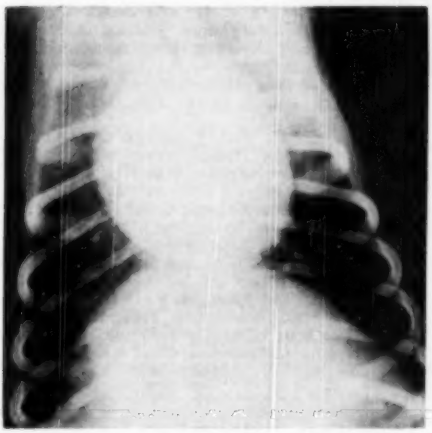
A detailed report on the above cases will be made in the near future.[3]

A thorough search was made in all dogs for pathogenic agents other than *H. capsulatum* but none could be demonstrated.

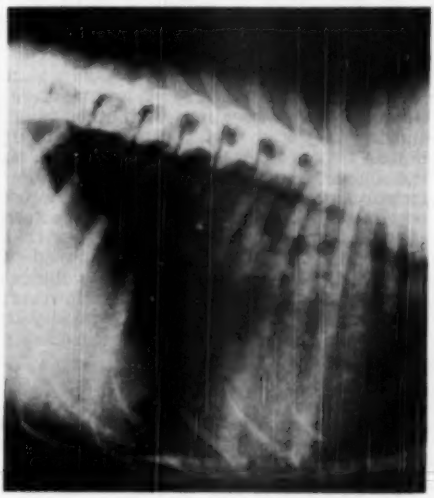
In those animals proved to have histoplasmosis, various strengths of histoplasmin were applied on several occasions. It appeared that 1:100 dilution of H-42 histoplasmin gave the most desirable reaction.

DISCUSSION

The low incidence of histoplasmin reac-



—*The Ohio State University*



—*The Ohio State University*

Fig. 2 — Chest radiograms. Left—anterio-posterior view; right—lateral view, showing nodules in the lungs of a dog, having a positive histoplasmin skin reaction, in which the diagnosis of histoplasmosis was established by culture of Histoplasma capsulatum from the liver and by microscopic demonstration of the organisms in the lesions.

tors (0.53%) in dogs from central Ohio is in direct contrast to the high incidence of histoplasmin reactors (62.9%) in human beings from the same area.[10] The incidence of histoplasmin reactors in the general population of dogs may be even lower than the

TABLE 2—Incidence of Histoplasmin Reactions in Dogs

	Positive (No.)	Negative (No.)
H-15 1:1,000	2	641
**H-42 1:100	5	666
*Totals	7	1,314

*All histoplasmin reactors failed to react to tuberculin.
**Because of the limited supply of histoplasmin, only 69 of the 671 dogs tested with H-42 1:100 received simultaneous injections of the H-42 1:10.

above data would indicate, since the animals tested were presented to the veterinary clinic for treatment of some illness.

When the 5 cases of naturally occurring histoplasmosis reported herein are added to the previously published reports, it is apparent that the vast majority have occurred in the middle western United States. This corresponds to the endemic area for the world's reported cases of histoplasmosis in man.

Although the incidence of histoplasmin reactors in dogs was quite low, it is highly significant that clinically active histoplasmosis was conclusively demonstrated in 4 of 7 reactors. There was no evidence of any disease other than histoplasmosis in the dogs reacting to histoplasmin.

The specificity of the histoplasmin skin test has been questioned by various workers. Because of cross reactions with other fungi and the very high incidence of reactors in human beings residing in the Middle West, the significance of the histoplasmin reaction in man and animals has been difficult to interpret. Although the incidence of reactors is small, from our data it would appear that the histoplasmin skin test when applied to dogs, may be a valuable aid in the clinical detection of active histoplasmosis. However, much additional study will be necessary to conclusively establish the diagnostic efficacy of the histoplasmin test.

CONCLUSION

1) Active, naturally occurring, canine histoplasmosis has been detected by the intradermal histoplasmin test.

2) Seven dogs out of 1,314 tested with histoplasmin showed a positive reaction, the incidence of reactors being 0.53 per cent.

3) In 4 of the 7 histoplasmin reactors, the presence of clinically active histoplasmosis was established by culture, by microscopic demonstration of *Histoplasma capsulatum* in the tissues, or both.

4) Five additional cases of canine histoplasmosis are reported, 1 of which was terminally ill with histoplasmosis and failed to react to histoplasmin. Four of the cases included in this study were previously recorded by the authors.

5) It appeared that a 1:100 dilution of histoplasmin H-42 gave a desirable skin reaction.

References

[1]DeMonbreun, W. A.: The Dog as a Natural Host for *Histoplasma Capsulatum*. Am. J. Trop. Med., *19*, (1939): 565-588.

[2]Olson, B. J., Bell, J. A., and Emmons, C. W.: Studies on Histoplasmosis in a Rural Community. Am. J. Pub. Health, *37*, (1947): 441-449.

[3]Seibold, H. R.: A Case of Histoplasmosis in a Dog. J.A.V.M.A., *109*, (1946): 209-211.

[4]Pará, M.: Histoplasmosis in Brazil. Am. J. Trop. Med., *26*, (1946): 273-293.

[5]Callahan, W. P., Jr.: Spontaneous Histoplasmosis Occurring in a Dog. Am. J. Trop. Med., *24*, (1944): 363-366.

[6]Parsons, R. J., and Everett, M.: Histoplasmosis in a Dog: Report of a Case (to be published). Quoted by Parsons, R. J., and Zarafonetis, C. J. D.: Arch. Int. Med., *75*, (1945): 1-24.

[7]Parsons, R. J.: Personal communication.

[8]Birge, R. F., and Riser, W. H.: Canine Histoplasmosis; Report of Two Cases. North Am. Vet., *26*, (1945): 281-287.

[9]Tomlinson, W. J., and Grocott, R. G.: Canine Histoplasmosis; A Pathologic Study of the Three Reported Cases and the First Case Found in the Canal Zone. Am. J. Clin. Path., *15* (1945): 501-507.

[10]Harmon, K. S.: Histoplasmosis in Dogs. J.A.V.M.A., *113*, (1948): 60-63.

[11]Prior, J. A., Cole, C. R., and Torbet, V.: An Evaluation of the Histoplasmin Reaction in the Detection of Naturally Occurring Histoplasmosis in Dogs (to be published).

[12]Thuringer, J. W.: Histoplasmosis: Report of Its Occurrence in a Dog. Arch. Path., *27*, (1944): 140-142.

[13]Emmons, C. W., Bell, J. A., and Olson, B. J.: Naturally Occurring Histoplasmosis in *Mus Musculus* and *Rattus Norvegicus*. Pub. Health Rep., *62*, (1947): 1642-1646.

[14]Mills, M. A., and Colwell, C. A.: Cutaneous Reactivity to Tuberculin in the Dog. Proc. Soc. Exptl. Biol. and Med., *37*, (1937): 470-473.

[15]Cole, C. R., Prior, J. A., and Cross, R. F.: To be published.

[16]Prior, J. A., and Allen, M. F.: Geographic Distribution of Histoplasmin and Tuberculin Reactors Among Ohio State University Freshmen and Student Nurses Training in Columbus, Ohio, Hospitals. Pub. Health Rep., *62*, (1947): 1608-1615.

Brucellosis is economically important in livestock and it is also a human disease. Therefore, we have two reasons for pushing control of the disease, the economic and the human health.—*W. A. Hagan, D.V.M., New York.*

Newcastle Disease

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ALTHOUGH known for scarcely more than a score of years, Newcastle disease (ND) has exhibited a variety of historical characteristics commonly manifested by other infectious maladies only after many years.

In the time allotted for this paper, only limited consideration may be given to the various properties of ND virus which may bear upon the apparent vagaries of deportment of the disease and upon its probable future behavior. There will also be considered briefly, certain timely findings and recent developments dealing with control. The more recent reviews of the various aspects of the ND problem largely eliminate the necessity of reference to the earlier literature.[1,2]

PROPERTIES OF THE VIRUS

The virus of ND is well suited to survival in nature. It is quite resistant to the adverse environment encountered in the habitat of its usual host, e.g., temperature, putrefaction, drying. It survives extended exposure to a wide range of pH values, extremes of 4 to 10 at 4 to 6 C. for a week or more, which are often inimical or fatal to its fellow viruses.[3]

Recently, Gordon *et al.*[4] reported that the skin of both dressed and unplucked infected carcasses of market poultry stored at 24 to 36 F. (-15 to 2 C.) remained infective for at least sixty days. Upton[5] found that infected, clear allanto-amnionic fluids of a single strain (Hertfordshire) frequently survived heating at 56 C. for thirty minutes in early egg passage, although not after 60 passages. In comprehensive studies of heat stability involving 31 strains of ND virus, Hanson[6] found that all strains were infective after fifteen minutes at 56 C., three became inactivated after thirty minutes, while three strains still remained infective after 180 minutes. Likewise, the stability of the virus hemagglutinin at 56 C. varied among many strains from five minutes to six hours.

It had been shown previously[7] that the virus was injured very slightly, if at all, by sojourn in embryonated eggs dead of the infection and left in the 37 to 38 C. incubator for twenty-four to forty-eight hours postmortem.

In disinfection studies with single strains of ND virus (11914 and Michigan 46-967, respectively), in the form of infected allanto-amnionic fluids, Tilley and Anderson[8] and Cunningham[9] similarly found considerable resistance to destruction even by the phenolic compounds.

Pathogenicity and Virulence.—These properties, inseparable in the complex phenomenon of the host-parasite relationship, warrant renewed attention and evaluation in relation to ND.

The host range or spectrum of ND virus would appear to be expanding. Aside from factors favoring its extension to new hosts, an awareness of the prevalence and proclivities of ND is perhaps responsible for the more frequent reports of its variable behavior. It seems not unlikely that the dearth of reports of milder types of the disease[10-13] prior to those from America may be accounted for, in part, by incomplete or superficial observations and diagnoses. Mortality among adult chickens has varied from zero (Dobson in England;[10,11] Komarov in Palestine;[12] Beach[13] and others in the United States) to 100 per cent, or nearly so (Crawford in Ceylon;[14] Sahai in India;[15] and Albiston and Gorrie in Australia[16]). Others[17,11,18] have described highly variable mortalities from ND in the United States. The former saw both low (10%) and high (90%) fatalities in adjacent poultry flocks in New Jersey. Binns *et al.*[19] reported a relatively fatal epizoötic in Utah during the fall of 1948, with losses up to 86.5 per cent and an average mortality of 48.6 per cent in 8 flocks totaling 13,639 birds of various ages.

Following the 1947 epizoötic in England, there was detected a "low" or subclinical form of the disease, except for occasional mild signs in chicks. It was concluded that this occult form existed in that country without clinical exacerbation for at least three years.[20]

More recent observations support previous evaluations which indicate that, aside from the influence of congenital passive immunity, there is with maturation of the chicken a considerable natural increase in refractivity.[1,21] That prior or concurrent devitalizing factors, including other maladies or environmental disturbances, may aug-

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ment the severity of ND attacks is exemplified by the marked adverse reactions sometimes seen when complications involve vaccinal infection.[29,31,33]

Wider prevalence of Newcastle infection among chickens has increased the opportunity for more abundant and extensive exposure of other species, mammalian as well as avian. Possibly indicative of the predictable behavior in species now considered to be relatively resistant, is the infection in ducks and geese. Earlier reports mention both death and complete insusceptibility of these species during outbreaks in fowl on the same premises or areas. Artificial infection of ducks appears most likely to succeed by the intravenous and intracerebral route.[34-38] Asplin's findings,[37] while supporting the relative refractivity of ducks and geese to ND infection from chickens, revealed that temporary, albeit subclinical, infection did occur. The latter was detected through tests of serums by means of the hemagglutination-inhibition (HI) test. Following contact or inoculation exposure of ducks and geese, shedding of the virus, with resultant infection of chickens in the same pen, was demonstrated. In this connection, it may be pointed out that Hallauer[23] was able to show that fowlpest-immune cocks, inoculated with the specific virus, eliminated it transiently and, through coitus, infected susceptible hens. Similar results were observed with ND.[39]

The potentiality for spread by immune fowl would support the likelihood that, with continued severe contact exposure of various mammals, as well as birds, further adaptation to palmipeds and various other species would be favored. Certain ND virus strains of avian origin, possessing high viability together with neural and/or pneumatic tropisms, should be admirably qualified to effect transfer of their parasitic affinities to other host species.

Additional diagnoses of ND infection in man include those of Ingalls[30] who recovered the virus from the eyes of 2 human cases showing the typical transient involvement described earlier by Burnet[21] and Anderson.[32] Howitt *et al.*[31] recently presented serologic and epidemiologic evidence of ND among children on clinical and serologic grounds. McGough[34] has recorded a number of cases of human infection.*

The adaptation of strain 11914 to serial passage in, and fatal infection of, the hamster by Regan *et al.*,[28,29] and the latest report of inoculation infection of the monkey (strain Manhattan),[27] further indicate that ND virus has adequate potentiality for expanding its host range in nature. Of interest, too, but perhaps of minor significance is the further demonstration by Hanson[6] that ND virus is "toxic" for mice when instilled intranasally.

Efforts to interpret the reports dealing with pathogenicity and virulence of ND suggest that those strains which produce mild disease favor their own perpetuation. Highly lethal infections tend to eliminate the parasite. Nevertheless, a highly fatal form of the disease has persisted in India for years. Thus, the impression is strengthened that ND will continue to present a difficult and obstinate problem wherever it exists.

Hemagglutinative Activity.—**Since the recognition that ND virus possessed hemagglutinative activity (HA) for chicken erythrocytes[38] similar to that of influenza,[39,40] the phenomenon has found wide practical application. Demonstration of prior infection or other experience with ND infection can be accomplished by means of specific inhibition of the virus activity (HI) by serum or egg yolk of exposed fowl.**

Simplification of the procedure and evaluation of several variables, e.g., source and age of red cells, temperature, time of development and persistence of HI, and comparisons with serum-neutralizing activity, have aided materially in expanding the utility of the method.[41-43] Minimal concentrations of approximately 20 times 10^6 embryo m.l.d. per cc. of some ND virus strains are required to induce hemagglutination.[42] Comparing the HI and serum-neutralization (SN) tests, Burnet[20] claimed that immune serum was 50,000 times as effective in the former test, in neutralizing the virus hemagglutinin, as it was in the latter. Bang[44] reported that the CG197 strain was only weakly hemagglutinative for fowl cells, and others[45,46] have observed well-defined variations and alterations of this characteristic which appeared due to factors other than quantitative ones. The differential hemagglutinative capacity of ND virus for various mammalian species, as studied and cited by Brandly *et al.*[41] and by Hanson,[6] may have value in distinguishing this virus from certain others. Discrepancies in the concentration of ND virus in different fluids and tissues of the infected embryonating egg were observed early.[20,42] Hanson[6] has recently shown that, while many ND strains produced high HA titers in both the amnionic and allantoic fluids, some others showed low concentrations of virus in the amnionic fluid.

The amnionic/allantoic indexes among several strains studied varied from 96 to 25. Differences in the HA stability to heating have been exploited for characterizing variations among various strains of ND virus with particular reference to their possible bearing on homogeneity, stability, immunogenicity, and epizoötiology.[5,42] The practical scope of the HI test has been expanded recently by the development of a method of ethylene dichloride-ether extraction of the egg yolk, thus permitting HI tests with eggs as well as serum.[43]

Antigenicity and Immunogenicity.—**Comparative studies of several ND strains[41,49] indicated definite, although generally slight, differences in antigenicity. As a rule, formalin-inactivated vaccine of the homologous strain afforded the highest degree of protection against the respective virus**

*It appears now that the evidence for human Newcastle disease infection by Howitt *et al.*[31] and McGough[34] is not adequate.

strain. All strains did not give evidence of equal antigenic and immunogenic efficiency and, thus, there is stressed the practical problem of providing, for vaccine production, strains of high and stable immunogenicity.

Burnet[50] has pointed out that, in the absence of serologic differences among strains of herpes simplex virus, marked diversity in virulence was apparent. Obviously, the converse must be anticipated with this and other agents.

Variability.—The great lability of viruses to variation and mutation is well exemplified by certain of the afore-mentioned vagaries of behavior shown by ND virus and the disease with which it is associated. Even the earliest reports on ND dealt with certain aspects of variation. The inability initially to demonstrate the virus in the blood of fowl in the Dutch East Indies was ascribed to alteration in the virus without regard to a possible host factor.

In maintaining that the relatively mild disease which appeared in California was a different entity from the generally grave ND of the eastern hemisphere, Beach[28] minimized the significance of the immunologic identity of the viruses isolated from the respective areas. The probability of an altered susceptibility of the host, with resultant alteration of the disease picture, was apparently disregarded.

Jungherr *et al.*[29] showed that differences or changes in tissue tropism can account for variations in such properties as invasiveness of the virus and in the symptomatology, cause, and pathology of ND infection.

In nature, many factors obviously contribute to selection for "virulence" (or resistance) of the host as well as the virus. An experience with ND in the laboratory may be cited as illustrative of the phenomenon of selection for high virulence of the virus in the presence of an adequate susceptible host population.[45] Rapid parenteral passage of strain RO in young chickens, followed by a series of transfers by respiratory route instillation, augmented the severity of the disease as well as its communicability. The latter was indicated by the great ease and higher incidence of contact transmission. On the other hand, the detection of the "low" or largely apathogenic ND infection in England[30] may be assumed to be indicative of selection for low virulence of virus or, just as logically, of the establishment of a balanced or equilibriated host-parasite relationship. Various other observations and studies on ND virus variants of low pathogenicity have been stimulated by the practical aspects of the problem of immunization.[1,9-11]

Expressive of the great variability in pathogenicity and other properties were the differences found by Hanson[6] among ND strains from various sources. Pathogenicity varied from 0 to 10^9 $L.d._{50}$ doses per ½ cc. of infected allanto-amnionic fluid; and the tropisms, from low to high degree of neural, visceral, and pneumal affinity. When propagated in chicken embryos, some strains yielded comparable virus concentrations in the allantoic and amnionic fluids; with others only 30 per cent as much virus could be demonstrated in the amnionic as in the allantoic fluids. When heated at 56 C. some lost their infectivity in thirty minutes, others were viable after 180 minutes. At this temperature, the stability of the hemagglutinin disappeared between extremes of five and 360 minutes depending on the strain. The capacity to stimulate HI in chickens varied among strains, and the respiratory toxicity for mice varied from strain to strain. Likewise, the species spectrum of hemagglutinative activity differed among strains, and there was some correlation between this erythrocyte affinity and the geographic region from which the strains were obtained.

DISSEMINATION OF THE DISEASE

Recent observations and surveys have largely substantiated prior reports on the means and mechanisms by which ND is spread.[3] Initiation of the 1947 epizoötic of ND in England,[61] like the 1942 outbreaks in Düsseldorf and Arnsberg, Germany,[2] was ascribed to the importation of market poultry. Uneviscerated, infected carcasses from Hungary were incriminated. In 33 per cent of the first 540 outbreaks, there was a history of access to swill or butcher's waste, the former in some cases being found to contain the offal of the imported carcasses. Traffic in live poultry accounted for 42 per cent of these first outbreaks. During later outbreaks, Gordon *et al.*[4] noted an apparent change, less than 5 per cent of the outbreaks arising from contaminated swill, while those originating from traffic in stock increased to over 70 per cent.

Poultry dealers and pet stores played a large role in dissemination of the disease. Seven per cent of the outbreaks were traceable to sales by breeders or to infection carried by mechanical means. Only 9 per cent of the outbreaks were related to local spread. The disease has been limited chiefly to swill-fed poultry and to flocks where stock was added from dealers, pet stores, and auction markets.

The fowl in the early incubative and frank stages of the disease is recognized as the most potent source of infective material. That it may sometimes harbor and/or eliminate virus during the later or convalescent period is also established. Available data suggest that few individuals remain carriers for extended periods after infection. Several workers have reported detection of ND virus in recovered chickens or in eggs laid during periods up to two

months following exposure or clinical recovery.[13,62,63] Pomeroy[46] recovered ND virus from a chicken which was showing illness seventeen months after having undergone recognizable ND infection. These and other observations on the Storrs Station flock[7] would point to a very low incidence of "carrier" individuals.

That the carrier state in ND would persist indefinitely in some animals is consistent with knowledge and experience with various other viral agents. If, as Burnet[50] has estimated for influenza, only 1 individual in 10,000 harbors latent infection, the spark is provided, under suitable conditions, for initiating a new epizoötic.

Isolation of ND virus from 4-day-old chicks, hatched from eggs of an infected flock when production was severely reduced, was reported by DeLay.[64] The virus was also obtained from embryos, dead after fifteen days incubation, which originated from breeding flocks when production was returning to normal. However, only one of three hatches of chicks originally containing infected embryos developed the disease. Activation of latent infection by the hen during egg production, with resultant shedding of infection, occurs in pullorum disease and perhaps during the breeding period in psittacosis. The possibility that such cyclic elimination may occur with ND cannot be overlooked.

The experience of Asplin[27] with ducks and geese which showed subclinical infection and transient shedding of the virus stresses the possible role as vectors of species now recognized as quite refractory. Gordon *et al.*[4] observed that the introduction of healthy turkeys from affected areas had apparently accounted for the origin of ND in some outbreaks. Thus, the probability that various other birds, especially free-flying species, may similarly act as carriers would appear to be strengthened. Doyle[65] suggested that wild birds may serve only as mechanical carriers between adjacent farms. He, therefore, disregards the possibility of subclinical infection and consequent spread and, furthermore, that sufficient adaptation of the virus to wild bird species could eventuate in development of greater concentrations in the new host and of more ready dissemination of the virus.

Factors in Newcastle Disease Control

Major aspects of ND control may be discussed from the standpoint of diagnosis, sanitary measures, and vaccination.

Diagnosis.—Study and improvement of laboratory diagnostic procedures have provided a sound basis for recognizing present or prior ND infection. Lack of equally efficient tests for identifying diseases with features common to those of ND is an unfortunate obstacle. This is particularly true where one or more infections in addition to ND are present in a flock or area and, consequently, may not be detected.

Newcastle virus may be isolated most readily from infected fowl during the incubative and early stages of infection. The embryonating egg serves as an ideal organism for the isolation and propagation of ND virus. Isolation from admixtures with bacteria has been greatly facilitated by the use of various antibiotics, especially combinations of penicillin and streptomycin.[41,66,67]

Certain other agents, e.g., those of bronchitis and laryngotracheitis, do not grow as well in eggs as does ND virus. If mixed infection is present, attention to route of inoculation is imperative, if opportunity for selective tropism and adaptation to the egg is to be provided. The addition of ND immune serum to the inoculum has been suggested as a means of suppressing the more vigorous and rapidly growing ND agent. Differential growth rate between one virus and another may serve to eliminate the slower growing one after several rapid transfers in the egg, e.g., the passage in eggs of fowlpest-ND virus mixtures at twenty to twenty-four hours permitted only fowlpest virus to survive after several transfers.[41] In addition to these, the following criteria employed for establishing the first identification of Newcastle virus in the United States and Europe[52,3,41] may be applicable: (a) course of the disease and pathology in embryos and chickens; (b) pH stability range; (c) hemagglutinative activity for the cells of chickens and other species; (d) cross-neutralization and agglutination-inhibition by specific virus-immune serum; (e) cross-immunity among vaccinated and recovered chickens.

Although obviously variable in persistence, the quantity and quality of ND immune substances produced following experience with ND virus also may be subject to great change. Circumstantial evidence that neutralizing antibodies were present in the serum (SN) for at least three years after infection was obtained from the Storrs Experiment Station flock.[7] Differences between the SN and HI principles were noted by Hanson[68] and Pomeroy[46] who also observed that SN titers persisted longer than did HI levels in hens following killed virus vaccination. Rached[68] reported results with a limited number of turkeys which indicated that HI activity persisted longer than the SN. Gordon *et al.*[20] assert that the HI titer remains at a high level

for six months after infection of chickens, ducks, geese, and turkeys. Observations by others obviously indicate that additional data are necessary before proper evaluation can be made of the temporal, qualitative, and quantitative, factors which may influence the immunogenic response to natural, as well as vaccinal, infection by a variety of ND virus strains under various environments.

Errors obviously may result in the diagnostic laboratory from the inadvertent use of eggs from hens in the incubative or the carrier stages of ND. The experience reported by Hitchner and Johnson,[60] wherein, after prolonged egg passage, the BI bronchitis culture was replaced by ND virus, possibly may be accounted for by the use of naturally infected eggs. The use of eggs from immune hens may also vitiate the results of egg isolation and diagnostic efforts.[21]

Sanitary Control.—In the absence of any system of sanitary regulation or control, the suppression of ND in this country has been completely without direction. Abortive attempts by certain states to exclude ND infection have been thwarted by postal regulations which largely abrogate intrastate control. Public apathy and unwillingness to curtail normal traffic in poultry, even after ND was identified, have continued to facilitate spread of the disease. At present, there is still no hint of the essential compulsory measures which, together with vaccination, may be eventually successful in suppressing, if not in eradicating, ND.

Doyle has reëmphasized that "because the live fowl is the most important agent in the dissemination of infection . . . prohibition of movement is an indispensable measure in the control of the disease." The eradication of ND from England on two occasions, and likewise from Australia, has been accomplished by drastic quarantine and slaughter measures in spite of rather wide initial extension of the infection in several instances. In countries where an organized control program has not been set in motion, unlimited dissemination and persistence of ND has been the rule.

In Great Britain, the 1936 Fowlpest Order makes ND a compulsorily notifiable malady. Other statutory orders controlling the importation of live poultry, prohibiting the feeding of unboiled swill, and the closing of certain markets have supplemented the stamping-out policy of eradication. The most effective legislative measure has been a "standstill" order controlling the activities of poultry dealers and of all poultry owners.

Immunization.—Recent encouraging progress has been made in the development of more satisfactory ND vaccines, both the inactivated and living modified virus types. The inherent advantages and limitations of each product are generally recognized and do not require enumeration here. Nevertheless, recent laboratory and field experience with the living vaccines further emphasizes the essential precautions and problems native to the use of all living vaccines. The ideal vaccine is economical, safe, and capable, with one treatment, of stimulating an immunity of reasonable duration. Safety implies inability to produce carriers and spreaders and of provoking no more than a mild systemic reaction.

The quest for strains of virus of sufficiently low or indifferent pathogenicity to make them satisfactory for vaccine production is based on the knowledge of variability and mutability of viruses as living organisms. This initial consideration implies also that, with certain precautions, the variants can be maintained in a stable state. The second, and equally practical, consideration is that the relatively apathogenic variant must engender or confer a substantial and durable degree of immunity against the prevailing infection in an area or country.

The already cited recent literature records numerous efforts to obtain strains of ND virus satisfactory for use as living vaccines.[7,10-60] In some instances, cultivation in an alien host was practiced in an attempt to accentuate or force selection. In other instances, strains grown in embryonating eggs or chickens were found to possess modified pathogenicity or to have undergone attenuation of high virulence during few or many passages. Present knowledge emphasizes the role of chance in dilution, selection, and eventual isolation or overgrowth of a certain variant or mutant from among the initial population of virus particles representing the parent strain. A temporary high survival value of a few particles may be the vital factor in the establishment of a new or variant strain.

As with other disease, there has been the untimely tendency to release for field use strains of ND virus of modified pathogenicity without adequate knowledge of their properties. Some apparently were used experimentally in field flocks with little more knowledge than that they failed to induce appreciable morbidity or mortality in a limited number of experimental birds under the particular conditions that prevailed. Only by more comprehensive and critical evaluation of vaccine strains may adequate standardization be effected and maintained. Efforts to characterize different strains of ND virus and to evaluate these characteristics as they may be related to antigenicity, immunogenicity, and virulence have recently been reported.[5,8,47] This approach may yield more adequate and useful criteria for the standardization of this and other vaccines.

Although a given vaccine may meet the max-

inum standards of safety and immunogenicity, the uncontrollable variation in host susceptibility and immunity response encountered under field conditions may not be resolved. However, candor prevents the anticipation that a living vaccine can supplant the inactivated product for use during infancy or high production, or where intercurrent disease and other devitalizing factors may lead to undesirable vaccination reactions and feeble immunity responses. Our recent experiences emphasize that ND strains of low pathogenicity may have a potentiality for activating latent or subclinical infections such as blackhead, which is equal to, or greater than, that of fowlpox vaccine. The suggestion that field flocks may be vaccinated simultaneously with living ND and fowlpox by the stick method[8] cannot be accepted presently as sound. Likewise, laboratory studies should precede dual or multiple vaccination with pigeon pox, laryngotracheitis, and planned exposure to bronchitis virus.

Current field observations emphasize that uniform immunity responses may not be expected from flock to flock. It is, furthermore, apparent that claims or implications that the living vaccines available commercially would produce permanent or life-long immunity were not founded on experimentally established facts. Statements as to the duration of immunity engendered by such vaccines must, therefore, await suitable data. Whether the immunity conferred by the living vaccine may be comparably profound and durable to that following natural infection also remains to be determined on an adequate basis. Some observations suggest that passive immunity conferred upon the chick by vaccination infection of the dam may be less substantial than that provoked by the naturally acquired disease.

The need for greater care and more careful regulatory control of animal vaccine manufacture was stressed during the past season when lots of fowlpox vaccine on the market were found to be contaminated with virulent ND virus.[70] The use for vaccine manufacture of eggs from flocks previously infected with ND or other virus diseases is obviously not warranted. The pneumotropic property of various strains of ND virus, including a majority of those of American origin, has been prominently manifested by all "vaccine" strains tested by us. There is the possibility that this finding may be correlated with the observation by Zawicki (1949) who reported the massive involvement of the visceral air sacs in broiler chickens from areas where frank ND was uncommon, but where living virus vaccination was a frequent practice. The aërocystitis in the broiler birds was so severe as to render them unsightly and undesirable for food, and hence, manual removal of the involved tissues was necessary before the carcasses could be placed on the market.

SUMMARY

The behavior of Newcastle disease (ND) of poultry during the slightly more than a score of years of its history emphasizes the gravity of the problem of its control. The virus of the disease is highly resistant and well suited to survival in nature. The neurotropic and pneumotropic features of the virus favor its extension to new hosts, mammalian as well as avian. Its recent experimental adaptation to laboratory mammals, the demonstration of its nonclinical occurrence in other birds, specifically ducks and geese, and its further incrimination as a human pathogen serve to stress the great adjustability and potentiality of ND virus. The capacity of the virus to agglutinate the erythrocytes of certain species of mammals, and those of birds, has been found useful in diagnostic tests and as a tool for assessing variability in and among strains. The high lability of ND virus to variation or mutation, as demonstrated by recent observations, accounts for numerous diverse expressions in behavior of the disease, especially with the appearance of very mild or occult forms. At the same time, there is reëmphasized the contribution of the host to the variable interaction which represents infectious disease.

Present, virtual world-wide distribution of ND directs renewed attention to the means of its dissemination and to the epizoötiology of the infection. Introduced into England in 1947 with uneviscerated market poultry carcasses, its predominant means of spread by movement of infected live poultry was soon regained. Recovery of the virus from fresh and embryonating eggs collected during the incubative and active stages of the infection, as well as at considerable periods after recovery, stresses the hazards of egg transmission. Epizootiologic evidence indicates the occurrence of protracted latent or carrier cases, although low in incidence.

The usefulness of the improved methods of diagnosis, which render those for ND second to none among poultry infections, is somewhat reduced by the lack of similar efficient procedures for detecting diseases with features common to those of ND. Direction for control of the disease in this country completely lacks the essential foundation of an organized sanitary program. On the other hand, definite progress is being made toward the development of more effective vaccines and procedures for immunization. The need of proper criteria

for assessing the suitability and continued stability of strains of virus for use in preparing vaccines, both the killed and modified living, demands further emphasis and research. Certain factors affecting the vaccine or the animal, which may result in undesirable vaccination reactions or ineffective immunity responses, must be recognized and guarded against. These include inadequate evaluation, standardization, and control of vaccines; the improper use of vaccines, especially the living products, in birds in the various states of devitalization, latent or concurrent disease; and simultaneous vaccination with other living vaccines, e.g., fowlpox.

Finally, it may be reëmphasized that ND represents a serious and difficult problem that will require great effort if it is to be combated effectively.

References

[1]Beaudette, F. R.: A Review of the Literature on Newcastle Disease. Proc. 47th Ann. Meet. U.S. Livestock San. A., (1943):122-177.

[2]Brandly, C. A., Moses, H. E., Jones, E. E., and Jungherr, E. L.: Epizoötiology of Newcastle Disease of Poultry. Am. J. Vet. Res., *7*, (1946):243-249.

[3]Moses, H. E., Brandly, C. A., and Jones, E. E.: The pH Stability of the Viruses of Newcastle Disease and Fowl Plague. Science, *105*, (1947):477-479.

[4]Gordon, R. F., Reid, J., and Asplin, F. D.: Newcastle Disease in England and Wales. Proc. 8th World's Poult. Cong., Copenhagen, Denmark, (1948):642-650.

[5]Upton, Elizabeth: Studies of the Relationship Between the Pathogenicity and Heat Resistance of Newcastle Disease Virus. M.S. Degree Thesis, University of Wisconsin, 1948.

[6]Hanson, R. P.: Characteristics of Certain Strains of Newcastle Disease Virus. Doctoral Thesis, University of Wisconsin, 1949.

[7]Brandly, C. A., Moses, H. E., Jones, E. E., and Jungherr, E. L.: Immunization of Chickens Against Newcastle Disease. Am. J. Vet. Res., *7*, (1946):307-332.

[8]Tilley, F. W., and Anderson, W. A.: Germicidal Action of Certain Chemicals on the Virus of Newcastle Disease (Avian Pneumoencephalitis). Vet. Med., *42*, (1947):229-230.

[9]Cunningham, C. H.: The Effect of Certain Chemical Agents on the Virus of Newcastle Disease of Chickens. Am. J. Vet. Res., *9*, (1948):195-197.

[10]Dobson, N.: Newcastle Disease. Eggs, (London, July 1934):11.

[11]Dobson, N.: Newcastle Disease. Proc. 7th World's Poult. Cong., Cleveland, Ohio, (1939):250-253.

[12]Komarov, A.: Personal communication, 1947.

[13]Beach, J. R.: Avian Pneumoencephalitis. Proc. 46th Ann. Meet. U.S. Livestock San. A., (1942):203-223.

[14]Crawford, M.: Ranikhet. Ann. Rep. of Government Vet. Surgeon, Colombo, Ceylon, (1930):25-28.

[15]Sahai, L.: Doyle's Disease of Fowls: Its Diagnosis and Control. Agric. and Livestock in India, *7*, (1937):11-17.

[16]Albiston, H. E., and Gorrie, C. J. R.: Newcastle Disease in Victoria. Austral. Vet. J., *18*, (1942):75-79.

[17]Barber, C.: Newcastle Disease Diagnosed in Georgia. Cornell Vet., *37*, (1947):260-261.

[18]Goldhaft, T. M., and Wernicoff, H.: High Mortality Associated with a Widespread Outbreak of Newcastle Disease. Cornell Vet., *38*, (1948):181-185.

[19]Binns, W., Nielsen, H. M., and Miner, W. L.: Severe Newcastle Disease Outbreak Causes Severe Losses to Utah Poultry Industry. Utah Agric. Sta. Farm and Home Sci., *10*, (1949):1-2, 17.

[20]Editorial: Newcastle Disease in Poultry. Vet. J., *104*, (1948):273-274.

[21]Brandly, C. A., Moses, H. E., and Jungherr, E. L.: Transmission of Antiviral Activity via the Egg and the Role of Congenital Passive Immunity to Newcastle Disease in Chickens. Am. J. Vet. Res., *7*, (1946):333-342.

[22]McDougle, H. C.: Personal communication, 1948.

[23]Brandly, C. A., and Winslow, N. S.: Unpublished data, 1947.

[24]Doyle, T. M.: A Hitherto Unrecorded Disease of Fowls Due to a Filter-Passing Virus. J. Comp. Path. and Therap., *40*, (1927):144-169.

[25]Picard, W. K.: Pseudo-Fowlpest. Dept. of Agric., Ind. and Commerce, Dutch East Indies. Vet. Bull., *65*, (1928):1-46.

[26]Komarov, A., and Goldsmit, L.: Preliminary Observation on the Modification of a Strain of Newcastle Disease Virus by Intracerebral Passage Through Ducklings. Vet. J., *102*, (1946):212-218.

[27]Asplin, F. D.: Newcastle Disease in Ducks and Geese. Vet. Rec., *59*, (1947):621-624.

[28]Hallauer, C.: Immunitätstudien bei Hühnerpest. IV. Mitteilung über vererbte Immunität. Ztschr. Hyg. u. Infektionskr., *118*, (1936):605-614.

[29]Brandly, C. A.: Unpublished data.

[30]Ingalls, W.: Personal communication, 1949.

[31]Burnet, F. M.: "Human Infection" with the Virus of Newcastle Disease of Fowls. Med. J. of Austral., *2*, (1943):313.

[32]Anderson, S. G.: A Note on Two Laboratory Infections with the Virus of Newcastle Disease of Fowls. Med. J. of Austral., *1*, (1946):371.

[33]Howitt, B. F., Bishop, L. K., and Kissling, R. E.: Presence of Neutralizing Antibodies of Newcastle Disease Virus in Human Sera. Am. J. Pub. Health, *38*, (1948):1263-1272.

[34]McGough, T. F.: An Outbreak of Newcastle Virus Disease in Tuscarawas County, Ohio. The Ohio State Med. J., *45*, (1949):26-36.

[35]Reagan, R. L., Lillie, M. G., Poelma, L. J., and Brueckner, A. L.: Transmission of the Virus of Newcastle Disease to the Syrian Hamster. Am. J. Vet. Res., *8*, (1947):136-138.

[36]Reagan, R. L., Lillie, M. G., Hauser, J. E., and Brueckner, A. L.: Response of the Syrian Hamster to the Virus of Newcastle Disease. Proc. Soc. Exptl. Biol. and Med., *68*, (1948):293-294.

[37]Wenner, H. A., and Lash, B.: Chorio-meauigoencephalitis Following Inoculation of Newcastle Disease Virus in Rhesus Monkey. Proc. Soc. Exptl. Biol. and Med., *70*, (1949):263-265.

[38]Burnet, F. M.: The Affinity of Newcastle Disease Virus to the Influenza Virus Group. Austral. J. Exptl. Biol. and Med. Sci., *20*, (1942):81-88.

[39]Hirst, G. K.: The Agglutination of Red Cells

by Allantoic Fluid of Chick Embryos Infected with Influenza Virus. Science., *94*, (1941) :22-23.

[29]McClelland, L., and Hare, R.: The Adsorption of Influenza Virus by Red Cells and a New *in vitro* Method of Measuring Anti-bodies for Influenza Virus. Canad. Pub. Health J., *32*, (1941):530-538.

[30]Brandly, C. A., Moses, H. E., Jones, E. E., and Jungherr, E. L.: Isolation and Identification of Newcastle Disease Virus. Am. J. Vet. Res., 7, (1946):289-306.

[31]Brandly, C. A., Hanson, R. P., Lewis, S. H., Winslow, N. S., Hoyt, H. H., Pritchard, W. R., and Nerlinger, C. M.: Variables and Correlations in Laboratory Procedures for Newcastle Disease Diagnosis. Cornell Vet., *37*, (1947):324-336.

[32]Hanson, R. P., Winslow, N. S., and Brandly, C. A.: Influence of the Route of Inoculation of Newcastle Disease Virus on Selective Infection of the Embryonating Egg. Am. J. Vet. Res., *8*, (1947): 416-420

[33]Bang, F. B.: Studies in Newcastle Disease Virus. I. An Evaluation of the Method of Titration. J. Exptl. Med., *88*, (1948):233-240.

[34]Upton, E.: Unpublished data.

[35]Pomeroy, B. S.: Personal communication, 1948.

[36]Hanson, R. P., Upton, Elizabeth, Brandly, C. A., and Winslow, N. S.: Heat Stability of Hemagglutinin of Various Strains of Newcastle Disease Virus. Proc. Soc. Exptl. Biol. and Med., *70*, (1949):283-287.

[37]Schmittle, S. C., and Millen, T. W.: Detection of Hemagglutination-inhibition Antibodies in Unincubated Eggs. Cornell Vet., *38*, (1948):306-309.

[38]Traub, E.: Aktive Immunisierung Mit Hühnerembryo-Impstoffen gegen die Zeit in Deutschland auftretende atypische Geflügel-pest. Zentralbl. f. Bakt. (I. Orig.), *150*, (1943):1-16.

[39]Burnet, F. M.: Virus as Organism. Harvard Univ. Press, (1945):134.

[40]Beach, J. R.: The Status of Avian Pneumoencephalitis and Newcastle Disease in the United States. J. A. V. M. A., *108*, (1946):372-376.

[41]Jungherr, E. L., Tyzzer, E. E., Brandly, C. A., and Moses, H. E.: The Comparative Pathology of Fowl Plague and Newcastle Disease. Am. J. Vet. Res., 7, (1946):250-288.

[42]Iyer, S. G., and Dobson, N.: Successful Method of Immunization Against Newcastle Disease of Fowls. Vet. Rec., *52*, (1940):889-894.

[43]Komarov, A., and Goldsmit, L.: The Use of Live Viruses in Palestine for the Vaccination of Poultry Against Newcastle Disease. Cornell Vet., *37*, (1947):368-372.

[44]Winslow, Nancy S.: A Study of the Pathogenicity and Immunogenicity of Several Strains of Newcastle Disease Virus. M.S. Degree Thesis, University of Wisconsin, 1947.

[45]Van Roekel, H., Sperling, F. G., Bullis, K. L., and Olesiuk, O. M.: Immunization of Chickens Against Newcastle Disease. J. A. V. M. A., *112*, (1948):131-132.

[46]Beach, J. R., Bankowski, R. A., and Quortrup, E. R.: A Preliminary Report on the Modification of Avian Pneumoencephalitis (Newcastle Disease) Virus by Cultural Methods. Cornell Vet., *38*, (1948):341-357.

[47]Beaudette, F. R., Bivins, J. A., and Miller, B. R.: Newcastle Disease Immunization with Live Virus. Absts. of Papers of 85th Ann. Meet. A. V. M. A., (1948):16.

[48]Markham, F. S., Cox, H. R., and Bottorf, C. A., Field Trials with Living Newcastle Disease Virus Vaccine. Absts. of Papers of 37th Ann. Meet. Poult. Sci. A., (June 1948):23.

[49]Hitchner, S. B., and Johnson, E. P.: A Virus of Low Virulence for Immunizing Fowls Against Newcastle Disease. Vet Med., *48*, (1948).

[50]Gordon, R. F., and Asplin, F. D.: Newcastle Disease in England and Wales. Vet. Rec., *59*, (1947):197-198.

[51]Jungherr, E. L.: Personal communication, 1946.

[52]Schoening, H. W., and Osteen, O. L.: Newcastle Disease in the United States. Proc. World's Poult. Cong., Copenhagen, Denmark, (1948):636-641.

[53]DeLay, P. D: Isolation of Avian Pneumoencephalitis (Newcastle Disease) Virus from the Yolk Sac of 4 Day Old Chicks, Embryos, and Infertile Eggs. Science, *106*, (1947):545-546.

[54]Doyle, T. M.: Newcastle Disease. Proc. 8th World's Poult. Cong., Copenhagen, Denmark (1948):17-26.

[55]Beaudette, F. R., Bivins, J. A., and Miller, B. R.: Use of Antibiotic Agents for bacterial Sterilization of Respiratory Exudates from Naturally Infected Cases of Newcastle Disease. Am. J. Vet. Res., 9, (1948):97-101

[56]Thompson, C. H., Jr., and Osteen, O. L: A Technique for the Isolation of Newcastle Disease Virus, Using Streptomycin as a Bacterial Inhibitor. Am. J. Vet. Res., 9, (1948):303-305.

[57]Hanson, R. P., Brandly, C. A., and Winslow, N. S.: Divergence of Serum Neutralization and Hemagglutination Inhibition Activity of Newcastle Immune Sera. Proc. 48th Gen. Meet. Soc. Am. Bact. (Abst.), *1*, (1948):35.

[58]Rached S.: Antibody Response of Turkeys Vaccinated with Formalin Inactivated Newcastle Disease Virus. Doctoral Thesis, Michigan State College, 1948.

[59]Hofstad, M. S.: Personal communication, 1948.

Poultry practice is of paramount importance to the veterinarian. He owes his best services along poultry lines to his clients and he is in a position to render more professional services to them than anyone else. —*C. W. Jackson, D.V.M., Kansas.*

Vitamin A has little, if any, bearing on resistance to *Eimeria tenella* infection in chickens.—*Wickware, Canad. J. Comp. Med., Sept.*, 1949.

The English language is the most important scientific instrument at your disposal. Learn to use it with precision.

Sulfadiazine forms a highly active bactericidal complex with the specific antibody-complement system in brucellosis. The effectiveness of this complex in killing bacteria in test tubes or in the body of the infected animal is governed by the number of inactive complement-binding antibody molecules present in the blood serum.—*I. F. Huddleson, D.V.M., Michigan.*

NUTRITION

The Toxicity and Nutritional Adequacy of Milk from Sows Suckling Pigs Showing Symptoms of Baby Pig Disease

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Stillwater, Oklahoma

DURING recent years, much attention has been centered upon the problem of high mortality of baby pigs. Excessive losses have been reported and a high percentage of the deaths have been attributed to the malady "baby pig disease." Symptoms of pigs reported having the so-called baby pig disease are varied but, in general, have followed a rather definite pattern. It has been postulated that a toxic substance may be present in the milk of sows nursing pigs having the disease. It has likewise been suggested that a deficiency of some nutrient or nutrients may exist in the milk of some sows, under certain conditions, causing the symptoms of the disease. The scope of this study was to investigate the possibility of the presence of a toxic substance or the lack of some dietary essential in the milk of sows nursing pigs having the disease.

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OBSERVATIONS

In the spring of 1948, practically all pigs from 16 gilts fed experimental corn-soybean oil meal rations developed symptoms, sometime during the suckling period, similar to those described by many workers.[1-6] A high percentage of deaths occurred in most litters. The first noticeable symptoms were vomiting and diarrhea. Within a few hours, the pigs became weak, emaciated, dehydrated, and developed a rough coat. The pigs generally nursed until they became too weak to stand, then went into coma, and died. The most consistent autopsy findings were gastroenteritis, congested mesenteric blood vessels, yellowish curd in the stomach, and urate deposits in the kidneys. A typical litter is shown in figure 1.

Tables 1 and 2 summarize the death loss data of the pigs from the 16 sows.

EXPERIMENTAL PROCEDURE

Milk samples were obtained from the

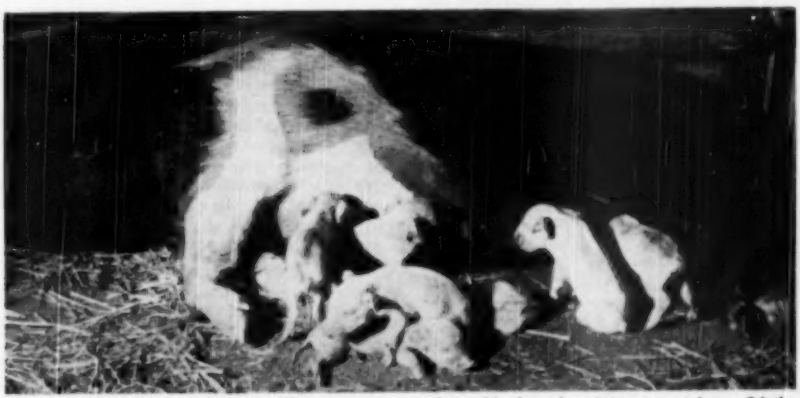

Fig. 1—A typical affected litter. These pigs were 3 days old when the picture was taken. Of the litter of 9, 2 died before the picture was taken and all of the others died the following day.

lactating gilts by the intravenous injection of 1 to 2 cc. of pitocin (Parke, Davis & Co.) as described by Whitehair *et al.*,[7] and Braude *et al.*[8] It was collected during the period in which the most severe symptoms were noted in the baby pigs.

TABLE 1—Mortality

No. of sows	16
No. of litters born	16
No. pigs alive at birth	104
No. pigs that died from birth to weaning	78
Pigs died from birth to weaning (%)	75

The milk samples were immediately frozen in sealed containers. To test the milk for toxicity or for a deficiency of a nutrient or nutrients, the milk, supplemented with iron, copper, and manganese, was fed, *ad libitum*, to weanling rats. No water or food other than the milk was supplied to the rats. Milk was also obtained from a sow in a separate herd and was fed to a second group of rats. This sow raised 10 healthy pigs to an average weaning weight of 38 lb. A third group of rats was fed milk from a Jersey cow. The growth and physical appearance of the rats were used as measures of toxicity and adequacy.

TABLE 2—Age Death Occurred

Days from birth till death	Pigs (No.)	Death Loss (%)
1 — 5	44	56.4
6 — 10	16	20.5
11 — 15	10	12.8
16 — 30	7	9.0
31 — 56	1	1.3
Total	78	100.0

RESULTS AND DISCUSSION

None of the rats (table 3) exhibited any apparent toxic effects from the milk of sows nursing diseased pigs. Significant growth differences among the lots were not observed. Similar results were reported by Whitehair *et al.*[7] The growth rates given in table 3 suggest that the supplemented milk from the experimental sows was nutritionally adequate for the rats.

TABLE 3—Effect of milk fed ad libitum supplemented with iron, copper, and manganese (5, 1, and 1 mg., respectively, per 100 ml. of milk)

Source of milk	Rats (No.)	Weeks on experiment	Average weekly gain (in grams)
Jersey cow	4	4	30.3
Control sow (raised 10 healthy pigs)	5	4	28.5
Experimental sows, suckling affected pigs	10	4	30.7

SUMMARY

1) A severe digestive disturbance occurred in suckling pigs from 16 experimental sows.

2) Symptoms observed were diarrhea, vomiting, emaciation, dehydration, rough hair, coma, and death.

3) Seventy-five per cent of the suckling pigs died before reaching weaning age and 56 per cent of that number died at 5 days of age, or younger.

4) Toxic substances or nutritional deficiencies could not be demonstrated in the milk of sows nursing "diseased" pigs, when the milk was fed to rats for four weeks.

References

[1]Graham, R., Sampson, J., and Hester, H. R.: Studies on Baby Pig Mortality. I. Acute Hypoglycemia in Newly Born Pigs. Proc. Soc. Exptl. Biol. and Med., *47*, (1941): 338-339.

[2]Extension Circular, University of Illinois Experiment Station: Save Baby Pigs (1942).

[3]Sampson, J., Hester, H. R., and Graham, R.: Studies on Baby Pig Mortality. II. Further observations on Acute Hypoglycemia in Newly Born Pigs. J. A. V. M. A., *100*, (1942): 33-37.

[4]Madsen, L. L., Earle, I. P., Heemstra, L. C., and Miller, C. O.: Acute Uremia Associated With "Uric Acid Infarcts" in the Kidneys of Baby Pigs. Am. J. Vet. Res., *5*, (1944): 262.

[5]Doyle, L. P., and Hutchings, L. M.: A Transmissible Gastroenteritis in Pigs. J.A.V.M.A., *108*, (1946): 257-273.

[6]Young, G. A., Jr.: Baby Pig Disease. J.A.V.M.A., *112*, (1948): 121-123.

[7]Whitehair, C. K., Grummer, R. H., Phillips, P. H., Bohstedt, G., and McNutt, S. H.: Gastroenteritis in Pigs. Cornell Vet., *38*, (1948): 23-38.

[8]Braude, R., Coates, M. E., Henry, K. M., Kon, S. K., Rowland, S. J., Thompson, S. Y., and Walker, D. M.: A Study of the Composition of Sow's Milk. The British J. Nutr., *1*, (1947): 64-77.

Ration Balanced—But Is It Palatable?—No matter how well the ration is balanced, if it is not palatable it will not be consumed in quantities sufficient to produce good results. Dusty feeds and rancid fat in feeds are unpalatable to large livestock and poultry. On the other hand, free-choice feeding of exceptionally palatable ingredients—for example, soybean oil meal for hogs—induces overeating. In such cases, it is advisable to add a mineral mixture to correct the overeating tendency.—*Lyman Peck, Feedstuffs, Nov.* 5, 1949.

Phosphorus deficiency may be shown by range calves nursing deficient cows and pasturing on deficient soils. Such calves are stiff and creepy, and they manifest the classic symptoms of phosphorus deficiency.—*A. H. Quin, D.V.M., Missouri.*

EDITORIAL

Federal Aid for Veterinary Education?

At the midwinter meeting of the Executive Board, it was voted that the Association should make an effort to have veterinary medicine included in Senate Bill 1453 and its companion measure H.R.5940 which were introduced in the first session of the Eighty-first Congress to provide "an emergency five-year program of grants and scholarships for education in the fields of medicine, osteopathy, dentistry, dental hygiene, and nursing professions, and for other purposes." The Board action followed a recommendation made by the Council on Education at its meeting in Chicago on November 27, which recommendation, in turn, stemmed from a resolution proposed by the Division of Veterinary Medicine of the Association of Land-Grant Colleges and Universities and adopted by the Senate of that association at its annual convention last October (see the JOURNAL, Dec., 1949).

The AVMA Executive Board action requires that the Committee on Legislation endeavor to obtain the inclusion of veterinary medicine in the bills in question during the second session of the Eighty-first Congress which convened on January 3. Since the matter has not been discussed widely in veterinary circles, the more significant features of the proposed acts should be presented at this time. When this piece of legislation was first introduced, the fact that veterinary medicine was not included was noted and was brought to the attention of the Executive Board. Knowing that there are frank differences of opinion as to the desirability of the use of federal funds in educational institutions, with resulting implications of eventual government control or of interference with the affairs of our educational institutions, the Board decided that the Association should not take any steps to have veterinary medicine included in the provisions of S.1453. Rather, it was felt that the need for, and desirability of, federal aid for our veterinary colleges was an important matter of policy which should be considered and decided by the administrative heads of the institutions at which veterinary colleges are located. Accordingly, the Board directed that the subject be referred to the Association of American Veterinary Deans and the Council on Education. This was done.

S.1453 was passed by the Senate in the first session of the Eighty-first Congress, but its companion measure—H.R.5940—never reached the floor of the House because of the failure of the Rules Committee to grant a rule that would permit a vote. However, it is expected that the legislation will receive early consideration in the present session of Congress.

For obvious reasons, the medical profession has studied the legislation carefully, and the action of the Board of Trustees of the American Medical Association in expressing opposition to the bill is significant. The bill is regarded by them (*J. Am. M. A.*, Dec. 17, 1949) as "potentially dangerous to the continued academic freedom of medical schools" and their Board felt that no such program of federal aid "should be embarked upon until protection of this freedom is guaranteed." The medical association also regards the proposed legislation as part of the program undertaken by the proponents of socialized medicine and is, therefore, opposed to it on these grounds.

To return to the veterinary aspects of the question, or rather the lack of them in the bills as now drawn, the following resolution is the one adopted by the Senate of the Association of Land-Grant Colleges and Universities, as previously referred to.

Whereas veterinary medicine was not included in Senate Bill 1453 introduced in the first session of the 81st Congress, cited as the Emergency Public Health Training Act of 1949, and whereas said act has not been finally passed and will be considered in the second session of said 81st Congress, and inasmuch as veterinary medicine is a public health field that should properly be included in such a measure with medicine, dentistry, osteopathy, public health, and nursing agencies which are included in S.1453, and whereas the present and future development of veterinary medicine as a public health agency is handicapped by a shortage of state and endowed funds, as in the case of the professions cited, therefore be it

RESOLVED, That the Association of Land-Grant Colleges endorses the inclusion of veterinary medicine in the provisions of the Emergency Public Health Training Act, and directs

its Executive Committee and other duly authorized committees to take such steps as may be proper toward inclusion of veterinary medicine in this or any act presented to the next session of the Congress which has for its purposes the grants-in-aid contained in S.1453.

The premise that veterinary medicine is an important agency in public health is sound. On this basis, there is justification for asking that it be included with the other medical professions in legislation of this sort in which the Congress declares the policy that "there is a shortage of physicians, dentists, dental hygienists, nurses, and other health personnel essential to maintaining and improving the nation's health and this shortage is likely to increase unless present facilities and opportunities for training such personnel are strengthened and expanded." On this point, again quoting from the A.M.A. *Journal* (Dec. 24, p. 1240), "These bills are predicated on a presumed emergency in medical education, which is, in fact, fictitious, since the annual number of admissions to medical schools is now approximately 7,000 compared to an average of 6,016 for the ten years preceding the war, and since the increase in the physician population from 1940 to 1948 was 14 per cent, as against a 12 per cent increase in general population, *i.e.*, a relative increase in physician population of more than 16 per cent."

On a similar basis, the veterinary school and graduate picture shows a 70 per cent increase in schools in the United States during and since the war (from 10 schools to 17) and a prospective increase of nearly 30 per cent in the number of veterinary graduates for the next several years, *i.e.*, from an annual average of 650 in the years 1940 to 1949, inclusive, to over 900 in the years 1950 to 1953 inclusive, and even more after that.

If this discussion appears to be pointed in two directions at the same time, there are reasons for it. As stated in the beginning, there has been no widespread consideration of S.1453 and H.R.5940 in veterinary circles and it is believed, therefore, that veterinarians should hear both sides of the question. Moreover, there are honest doubts in the minds of many thoughtful persons about the desirability of, and need for, federal aid to veterinary education. If legislation of this kind is to be passed by the Congress, then veterinary medicine certainly should be included for the reasons stated in the foregoing resolution. However, efforts to have veterinary medicine included in the bills should not be regarded as endorsement of a policy enunciated by Congress on which there are strong differences of opinion.

George Henry Glover
1864—1950

Dr. G. H. Glover, 86, founder and retired dean of the Division of Veterinary Medicine, Colorado A.&M. College, died January 11 at his home in Fort Collins, where he lived and worked for more than sixty years as teacher, livestock hygienist, and edu-

Dr. G. H. Glover

cator. He was graduated from Iowa State College in 1885. His classmates were Sesco Stewart, W. B. Niles, Charles McBryde, E. E. Sayers, D. C. Collins, and W. E. Johnson —all of whom made veterinary history.

Until 1907, Dr. Glover was variously occupied in experiment station and livestock sanitary work and in teaching veterinary science to students of agriculture. Since then, his labors were bouyant and fruitful. He marched straight into the presidency of the AVMA in less than three years (San Francisco in 1910) without a dissenting voice. His flair of surrounding himself with Newsom's and Kingman's and Farquharson's and his own innate ability took Fort Collins to every nook of the veterinary world. That something not made by hands, and the knack of telling the world *sans* boastful fanfare, are what our departed colleague had in the *n*th degree.

The veterinary world will not cease to love him, for "to live in hearts we leave behind is not to die."

He is survived by his widow, *née* Lenore Talty, and his son, Grant; three grandchildren, one of whom is Dr. G. N. Glover (COLO '40), of Torrington, Wyo.; and seven great grandchildren.

CURRENT LITERATURE

ABSTRACTS

Foot-and-Mouth Disease Vaccine

When the virus of foot-and-mouth disease was exposed to ultraviolet rays, there was produced a noninfective modification—anavirus. This anavirus possessed pronounced immunizing properties.

Adsorbates prepared from virus samples so treated became vaccines having powerful antigenic effects, and produced an immunity of longer duration than anavirus alone. Adsorbates of active virus and aluminum hydroxide formed vaccines of a similar high quality.—[*S. Schmidt, A. Hansen, and P. Holm: Irradiation of Foot-and-Mouth Disease Virus with Ultraviolet Rays. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 341-343.]

Brucellosis Immunity from Ether-Killed Organisms

Many of the objections to use of a live Brucella vaccine would be obviated by development of an efficient vaccine composed of killed cells. Earlier work has developed such a vaccine from ether-killed *Brucella abortus*. The current report is of two improved products in which the ether-killed cells are alum-precipitated, or are emulsified with mineral oil and falba. The adjuvant properties of both processes seem to warrant additional use in experimental animals, and in cattle.—[*I. Live: Effect of Adjuvants upon the Immunizing Quality of Ether-Killed Brucella Abortus. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 347-350.]

Papular Dermatitis in Horses

The author has described a mild form of skin disease in Thoroughbreds and reports inability to find in the literature a description which would seem to fit his cases.

The lesions were numerous papules about the size of "BB" shot. Each lesion was concentric and firm, but neither vesicular nor pustular. Within seven days, scabs formed and when these dropped off, they left circumscribed areas which were desquamated and hairless. The patients suffered no pruritus, irritation, or noticeable discomfort. Feed and water consumption remained normal, and the general activity and condition of the patients were surprisingly good.

A virus was isolated from these lesions by inoculation of embryonated chicken eggs, and this virus was capable of reproducing the disease. It could again be recovered from the lesions produced. The author is engaged primarily in diagnostic and not in research work, but suggests several lines of experimental study which should be followed in order to clarify the picture.—[*R. W. McIntyre: Virus Papular Dermatitis of the Horse. Am. J.* Vet Res., 10, (July, 1949) :229-232.]

Sulfonamide Shock in Dairy Cattle

The drug shock which follows intravenous administration of large doses of the sulfonamides deserves serious consideration. Such shock is fairly common, even when following an accepted regimen of dosage. Sulfaquinoxaline appears to be most toxic, sulfamethazine less so, and sulfapyridine upon repeated injections. Following the administration of sulfaquinoxaline, the clotting time of the blood was two or more times normal.

In the cows studied, the kidneys of all showed acute, passive congestion of the medullary venules. There was a partial loss of the cytoplasm of the tubular epithelium in the kidneys of half, and albuminous casts in one third of the cows. Microscopically, all of the liver sections showed cloudy swelling and albuminous degeneration. Sometimes, this was accompanied by advancing necrosis of the hepatic epithelium, and by deposits of intracellular fat.

Examination of nervous tissue from 1 cow showed extensive nerve degeneration. There was a myelin degeneration of the sciatic and median nerves, which presumably explained a paralysis of the legs. There was, also, extensive myelin degeneration of the tissues of the central nervous system, notably in the first lumbar section of the spinal cord.—[*L. M. Jones, H. A. Smith, and M. H. Roepke: The Effects of Large Doses of Various Sulfonamides Injected Intravenously in Dairy Cattle. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 318-326.]

Rabies Vaccine Studies

Homologous antibodies were produced in dogs vaccinated with a single 5-cc. injection of a standard phenolized rabies vaccine; and also when vaccinated with a single 5-cc. injection of a chick brain-adapted and chicken embryo-adapted vaccine, a mouse-adapted strain, and a rabbit-fixed strain.

Sixty days after vaccination, 32 vaccinated animals and 15 unvaccinated controls were exposed by intramasseter inoculation of canine salivary gland suspension infected with street virus. Two of the vaccinated dogs and 8 (53%) of the controls succumbed.

The data should be considered preliminary in

nature but showing a good level of immunizing potency and worthy of further study to ascertain possible differences in immunizing power.—[*E. S. Tierkel, H. Koprowski, J. Black, and Rachael H. Gorrie: Preliminary Observations in the Comparative Prophylactic Vaccination of Dogs Against Rabies with Living Virus Vaccines and Phenolized Vaccine. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 361-367.]

Sinusitis in Turkeys

Sinusitis in turkeys is caused by a transmissible agent which produces not only sinusitis but, in some instances, either macroscopic or microscopic evidence of pneumonia and air sac infection. In the early stages, there was a severe catarrhal inflammation of the mucosa. Later, there were infiltration, fibrosis, and hyperplastic lymphofollicular nodules in the submucosa. Pneumonia and air sac infections, and the lymphofollicular nodules which accompanied them, assumed a pathognomonic significance. The lesions resembled those caused by Rickettsia.—[*E. Jungherr: The Pathology of Experimental Sinusitis of Turkeys. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) :372-383.]

Frequency of Intradermal Testing

Because injection of johnin intradermally may produce a local desensitization of indefinite duration, the authors studied the interval which would insure disappearance of this local desensitization and eliminate interference.

They found that desensitization was exceedingly high at one week. At two weeks, the positive reactions were about 75 per cent while at four weeks they were about 87 per cent. They found, however, that injections made at one site had no influence on the results of injections at new sites made at the same time or later.—[*A. B. Larsen and H. W. Johnson: Studies on Johnin. VII. Frequency of Intradermal Testing as Related to Local Desensitization. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 344-346.]

How Age Affects Mastitis Spread

The authors conclude that there was no significant relationship between susceptibility and age of the animal. This conclusion is based on observations with 629 animals that were exposed. This group included 205 cows in second lactation or higher, which had been previously infected and cured, as well as 236 control animals over the same lactation range. The control animals had never been infected. The average age of the former group was 5.01 lactations, and the control group was 3.53 lactations — making a difference in age of 1.48 lactations. According to the theory of Murphy that increasing age indicates an increasing susceptibility, the differences between these two groups should have been 26 to 31 per cent. The actual difference in infection was found to be only 2.03 per cent. Since the infected-and-cured group should represent a susceptibility of 100 per cent, the fact that only 21.95 per cent actually became infected indicates that the relation to age hypothesis is not correct. Of the control animals, a total of 19.92 per cent became infected, and this slight difference indicates practically no correlation between age of cow and susceptibility to infection. The general conclusion of the authors is that clean, old animals are practically no more susceptible to *Streptococcus agalactiae* infection than clean animals of second, third, and fourth lactation.—[*R. Ormsbee and O. W. Schalm: Epizoötiology of Mastitis: The Relative Importance of Extended Exposure and of Age in the Spread of Streptococcus Agalactiae Infection. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 307-313.]

Penicillin Levels

When penicillin solutions were injected intramuscularly in cattle, it was found that crystalline penicillin G in aqueous solution gave high blood and urine levels for short periods. Penicillin in the Romansky formula presented blood levels for a longer time. Procaine penicillin G in oil presented levels for about the same length of time as the Romansky formula, while procaine penicillin in peanut oil containing 2 per cent aluminum monostearate maintained blood levels for a longer time than any of the other products.

This information is important because subbacteriostatic concentrations of penicillin may produce resistant strains of the infecting microörganisms. Some early work indicated that sustained small concentrations of penicillin in the blood were more effective than high levels for shorter periods.—[*E. V. Morse: The Response of Cattle to Penicillin Preparations Following Intramuscular Injection. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 314-317]

Lung Extracts and Clotting Time

Lung extract accelerates blood clotting, lessens the healing time of experimental wounds when applied to the fresh bleeding surfaces, and produces a marked increase in oxygen uptake of liver. The factors which accelerate tissue respiration and blood clotting are thermolabile and are so effective that 0.0001 cc. will accelerate the clotting of 2 cc. of freshly drawn blood.—[*R. W. Dougherty, G. H. Conner, and H. Migaki: Tissue-Respiration-Stimulating and Thromboplastic Activity of Bovine Lung Extracts. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 327-330.]

Anatomy of the Bovine Liver

Ligation of the hepatic artery in the rabbit causes widespread necrosis of the liver tissue, but the bile duct remains apparently unharmed. This would indicate that the ducts are not dependent upon the capillaries for their maintenance. By making vinylite-corrosion casts of the circulatory vessels of the liver, it was possible to study the subgross anatomy of this organ in three dimensions.

The author demonstrated existence of portal circuits formed by the anastomosis of two fine portal branches, each originating from a moderately sized portal radical. Extensive plexuses of small arteries surround the large bile ducts. The techniques described will provide a means by which the blood volume of a given organ can be estimated rather accurately.—[*L. M. Julian and K. B. DeOme: Studies on the Subgross Anatomy of the Bovine Liver. I. The Distribution of the Blood Vessels and Bile Ducts as Revealed by the Vinylite-Corrosion Technique. Am. J. Vet. Res.*, 10, (*Oct.*, 1949) : 331-335.]

Q Fever in Spain

The authors describe the isolation of three strains of *Rickettsia burneti*, from ticks of the species *Hyalomma marginatum* and *Rhipicephalus bursa* collected from calves in Seville, and from *Rhipicephalus sanguineus* of a dourmouse (*Eliomys quercinus*) in Madrid.

The three mentioned strains have produced, in guinea pigs, a typical infection accompanied by production of antibodies, demonstrable by the complement-fixation reaction, and have been easily cultured in the vitelline membrane of the chicken embryo.

The serum obtained during the convalescent period, from guinea pigs infected with these strains, fixed the complement against an antigen prepared with the American strain of Q fever, Nine Miles, and also in the presence of an antigen prepared from one of the strains isolated by the authors.

It is possible that in Spain, as in Greece, Italy, Switzerland, and Germany, outbreaks of Q fever are being diagnosed as grippe, pneumonitis, and others. All collaboration from clinicians and epidemiologists in this respect is earnestly welcomed.

The study of the veterinary aspect of the problem is underway, *i. e.*, the infection of cattle and goats and their products, together with the disease in wild animals.—[*F. Pérez Gallardo, G. Clavero and S. Hernández Fernández: Rickettsia burneti, Etiological Agent of Q fever Found in Spain. Rev. de Sanidad e Higiene Pública* (*Spain*), 23, (*June*, 1949) : 489-496.]—O. A. LOPEZ-PACHECO.

BOOKS AND REPORTS

Parasitology

The book deals primarily with the parasites of man, but those important in veterinary medicine have not been entirely omitted. In fact, the publishers say "All the common parasites of domestic animals are mentioned, and the important ones discussed in some detail." We have not tried to check all of them, but find that the more important among the common parasites are truly "discussed in some detail."

This is not accomplished by setting the animal parasites off in a section by themselves, but rather by integrating the discussion of each parasite with its appropriate group. This means that the human parasitologist will get the proper picture of relationship of animal-human parasitism, but the veterinarian would find it difficult to locate those paragraphs dealing directly with animal health.

The text is especially well prepared, and the information can be obtained readily because of the easy, normal manner in which the paragraphs flow. In this respect, the book is easier to read than one which lists the various parasites in taxonomic order for the student.—[*Introduction to Parasitology. By A. C. Chandler, Ph.D. 8th ed. Cloth. 756 pages. Profusely illustrated. John Wiley & Son, New York, N. Y. 1949. Price* $6.00.]

Streptomycin

The nature and applications of this antibiotic agent are discussed. The phenomenal rise of streptomycin is indicated by the nearly 1,500 references available from countries in all parts of the world.

The book is divided into four sections: microbiological and chemical aspects; antibacterial and pharmacologic properties; clinical uses; and miscellaneous uses. Among the 58 contributors, 7 are veterinarians: W. H. Feldman and A. G. Karlson, Streptomycin in Experimental Tuberculosis; K. F. Meyer, Plague; C. A. Brandly, Use of Streptomycin and Other Antibacterial Agents for Recovery or Isolation of Viruses; W. G. Venzke and C. R. Smith, Streptomycin in Small Animal Medicine; O. W. Schalm, Streptomycin in the Treatment of Certain Infections of the Bovine Mammary Gland.

Throughout the four sections, the authors present the detailed scientific data as well as the practical applications of this wealth of information. In fact, especial stress has been placed on the clinical uses for this antibiotic agent. More time and space is devoted to its use in tuberculosis than in any other disease.—[*Streptomycin. Edited by S. A. Waksman, Ph.D. Cloth. 618 pages. Illustrated. The Williams & Wilkins Co., Mt. Royal and Guilford Aves., Baltimore 2, Md. 1949. Price* $10.00.]

Progress in Artificial Insemination

This bulletin lists the members of the National Association of Artificial Breeders and presents the program of its 1949 convention. In addition to the reports of the officers, there were further reports from committees on bull management, semen preparation and preservation, shipping precautions, insemination technique, research, and copies or abstracts of papers presented to the convention. The minutes of the business meeting are presented along with the articles of incorporation and the by-laws.

Forty-four associations are listed as members of the National Association of Artificial Breeders. This meeting was held at Dyersburg, Tenn., and 135 persons registered as attending the session.

The bulletin presents the details of technique

of collecting, preparing, diluting, and using semen in the A.I. program. The research committee lists some of the problems which still face the rapidly growing organization, and the questions propounded indicate that some of them are on the way to solution, whereas others may continue to present questions for some time to come.—[*Proceedings, National Association of Artificial Breeders of Dairy Cattle, 1949 Annual Convention, Dyersburg, Tenn. Paper. 60 pages. Fred J. Hatler, Secretary-Treasurer, Yorkville, Tenn.*]

Veterinarian

This monograph is No. 3 in a series which presents the American occupations. The history of veterinary medicine, the fields of endeavor, the importance of the profession to society, the number of people engaged in the profession, remuneration which may be expected, advantages and disadvantages, the educational requirements, and practical experience all are discussed in this book. In its 26 chapters, the author has compiled a vast amount of information which will be interesting and instructive to all members of the profession.—[*Veterinarian, No. 3 in a Series on American Occupations. By T. J. Jones, D.V.M., Georgia. Paper. 32 pages. Research Publishing Co., Boston, Mass. 1949. Price $1.00.*]

Nutrient Allowances for Horses

This report of the committee on animal nutrition of the National Research Council forms No. 6 of the series called "Recommended Nutrient Allowances for Domestic Animals."

The monograph is written with a realization that horse power on the farm has declined, but light horses are becoming more popular and the riding horse has come to occupy an increasingly important position in the field of recreation.

As in previous reports, the requirements are considered from the standpoint of energy, protein, minerals, vitamins, and then a summary of the feeds for horses and a listing of some examples of adequate rations.—[*Recommended Nutrient Allowances for Horses, No. 6, A report of the Committee on Animal Nutrition, National Research Council, 2101 Constitution Ave., N. W., Washington 25, D. C. Paper. 29 pages. 1949. Price 50 cents.*]

Practical Dairy Bacteriology

If more education in practical bacteriology is the solution to the problem of raising the quality of dairy products, then this book might well be required reading for everybody in the dairy industry. The writer, who is professor of dairy bacteriology at Oregon State College, has done a good job of presenting the normally technical subject of bacteriology in a way that is readily understandable and interesting.

The book opens with a four-chapter orientation on the types of microörganisms that play friendly and unfriendly roles in dairy production, tracing their habits all the way from the farm through the processing plant to the family dinner table. Subsequent chapters deal critically and in detail with platform and laboratory tests for quality; sources of contamination on the farm; milk-borne diseases; pasteurization methods; milk grades; techniques of butter and cheese production, including about two dozen different kinds of foreign and domestic cheese; processing of fermented, condensed, and powdered milks; ice cream making; and methods and materials used in cleaning dairy equipment.

Common milk-borne diseases are discussed without minimizing or overplaying their dangers. Bovine mastitis and septic sore throat, tuberculosis, brucellosis, and others in this category, are considered, although nowhere in the book is any mention made of Q fever—a regrettable omission, especially in a publication as late as 1949.

The few flaws cited, however, are dwarfed by the wealth of accurate information and sound, practical guidance this book offers. Veterinarians who do milk inspection work should profit from reading it, and those in large animal practice could glean many ideas that would aid their application of preventive medicine on the farm.—[*Practical Dairy Bacteriology. By Paul R. Elliker. Cloth. 391 pages. Illustrated. McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 18, N. Y. 1949. Price $4.00.*]

Nutritional Data

This booklet, which is the successor to "Nutritional Charts" for medical and other specialists, presents a detailed description of the several food substances and their use in formulating diets and rations. A new section emphasizes the importance of proteins.

Information about the several vitamins, amino acids, and other food substances appears in tables showing the sources, the daily dosages, and positive actions of these items. The later chapters of the book discuss the diet in health and disease and provide tables of composition and nutritive value of the various foods commonly eaten by man. There is also an extensive section on suggestions for further reading in the various fields covered by the book.—[*Nutritional Data. Edited by H. A. Wooster, Jr., and F. C. Blanck, Published by H. J. Heinz Co., Pittsburgh, Pa. Paper. Ring binder. 120 pages. 1949. Gratis, if ordered through the Mellon Institute, Pittsburgh 13, Pa.*]

AAHA Bulletin

Effective with the October, 1949, issue, printing presses have replaced mimeograph machines in publishing the American Animal Hospital Association's quarterly *Bulletin*. It is edited by Executive Secretary Wayne H. Riser, of Skokie, Ill., and devoted to congenial, newsy accounts of what AAHA members are doing. Circulation is to members only.

THE NEWS

Eighty–Seventh Annual Convention

Miami Beach—August 21-24, 1950

Florida Tour Planned

Travel experts are mapping a network of land, air, and sea routes that will bring AVMA members and their guests from all parts of the nation together in Jacksonville for a sight-seeing tour of western Florida, prior to the opening of the Miami Beach convention.

The tour will be arranged so that the party will arrive in Miami Beach on the afternoon of August 20—the day before the convention opens. Among the stopping-off places will be the famed Bok Tower and the Everglades. Principal western Florida cities to be visited are Silver Springs, Tampa, Clearwater, and St. Petersburg.

Happiness Tours of Chicago, the travel agency which so successfully organized and managed the 1948 AVMA San Francisco convention tour, will handle all arrangements in coöperation with the Association's central office. Assurance has been given that the itinerary will include "everything worth seeing and doing in Florida."

Each person in the tour party will get personalized service from the travel agency in arranging

—Miami Beach News Bureau

Lincoln Road, the fashionable shopping center in Miami Beach where the 87th annual meeting of the AVMA will be held on Aug. 21-24, 1950.

transportation from his home to the converging point in Jacksonville, where the Florida tour will begin. In most cases, it will be possible to arrange for members of the party to start in groups at central locations in the United States—providing an opportunity for congenial travel in the company of friends and professional colleagues on the way to Jacksonville. Or, if preferred, members may drive to Jacksonville and meet the tour party, picking up their automobiles there after the convention is over.

The hotels and housing subcommittee of the Committee on Local Arrangements will provide ample and excellent accommodations at selected Miami Beach hotels near the new municipal auditorium, where convention activities will be centered. However, if members of the tour party so desire, the travel agency will reserve rooms for them in the convention city as part of the tour service; the hotel selected for this purpose is one of the best on the ocean front.

Additional details of this tour, including complete itinerary, dates, and costs, will be announced in a later issue of the JOURNAL.

HAVANA TOUR ALSO PLANNED

Among other travel plans now in the making is a postconvention trip to Havana, Cuba, at nominal cost. It includes an overnight cruise on the "S.S. Florida," with two full days in Havana and accommodations at the Plaza Hotel. A trip to historic Morro Castle by boat, sight-seeing in Havana, and visits to night clubs are also scheduled. It is expected that this tour will be integrated with plans that may be made by Cuban veterinarians for a postconvention program.

CONVENTION PROGRAM TO ALLOW EXTRA TIME FOR RECREATION

Because there are so many scenic and recreational attractions in the Miami Beach area, the convention program is being arranged to allow additional time for sight-seeing and sports on two afternoons and evenings. Section programs will be conducted along the lines of recent years, but present plans call for omitting one of the general sessions. The program being scheduled by the section officers promises to be excellent, and speakers will be announced soon.

Watch these pages each month for new information about the Miami Beach meeting. And, in the meantime, start making your plans to be there. The dates: August 21-24, 1950. On every count, it will be a great meeting.

The Semiannual Session of the Executive Board

The Executive Board met in Chicago on Nov. 28-29, 1949. The members are shown in session on the 29th (left to right)—Drs. B. J. Killham, District 10; C. C. Franks, District 5; A. L. MacNabb, District 1; N. J. Miller, District 6; W. M. Coffee, ex officio; L. M. Hurt, ex officio; C. D. Van Houweling, director of professional relations; J. G. Hardenbergh, executive secretary; W. G. Brock, chairman of the Board, District 8; Mrs. Thomas, the reporter; Drs. R. C. Klussendorf, assistant executive secretary; Edwin Laitinen, District 9; S. F. Scheidy, District 2; R. S. Sugg, District 4; E. E. Wagner, District 7; O. Norling-Christensen, District 3; and C. P. Zepp, Sr., ex officio.

Resolutions Adopted by the Fourteenth International Veterinary Congress

The resolutions adopted by the Fourteenth International Veterinary Congress in session at London, Aug. 8-13, 1949, were recently transmitted by Prof. L. DeBlieck, general secretary, to Dr. W. A. Hagan, United States member of the Permanent Committee of the Congress, with the request that they be given as wide publication as possible. It is believed that these resolutions are of interest to veterinarians generally and they are, therefore, printed in full.

The proposal contained in Resolution No. XII, relating to annual contributions from all countries represented on the Permanent Committee, in order to place the work of the Congress secretariat on a stable financial basis, will be referred to the AVMA Executive Board and House of Representatives. Resolution No. XIII will also require consideration by the Association.

RESOLUTIONS ADOPTED

I) **Swine Influenza.**—In view of the economic importance and the possible public health significance of the viruses responsible for swine influenza, the 14th International Veterinary Congress recommends that arrangements be made for viruses isolated in different countries to be sent to selected established centers and examined by the techniques used for strains of human origin by the World Influenza Center.

(The Permanent Committee was asked to forward the resolution to the World Health Organization, asking it to establish a consultative Veterinary Committee, which could develop the details. The following persons are proposed: Dr. H. W. Schoening, Washington, D.C., for the American area, Professor T. Dalling, Weybridge, England, for Europe, and Professor Dr. W. I. B. Beveridge, Cambridge, for the Southern Hemisphere.)

II) **Tuberculosis.**—The 14th International Veterinary Congress learned with satisfaction that the International Office of Epizoötics in Paris has included in its agenda for its next meeting, which is to be held in May, 1950, the question of nonspecific reactions during tuberculinization.

The 14th International Veterinary Congress recommends that prophylaxis against animal tuberculosis be included in the agenda for the 15th International Veterinary Congress.

III) **Mastitis.**—In view of the recent developments which make it possible to curtail radically the economic losses caused by infectious bovine mastitis, and in view of the present shortage of milk and milk products, this Congress recommends that all countries endeavor to carry out efficient control.

IV) **Brucellosis.**—In view of the seriousness of brucellosis as an economic and public health problem, it is resolved by the 14th International Veterinary Congress that:

1) Efforts be made by all possible means to eradicate the disease;
2) Until eradication by test and slaughter is practicable, vaccination is recommended as a first step and should be correlated with the eradication program. The vaccine must be produced with the same safeguards as to virulence and immunizing properties as the United States Bureau of Animal Industry strain 19 vaccine.
3) It is further resolved that diagnostic tests and methods be standarized in each country, and that an international standard for the agglutination test be agreed upon.
4) As a public health safeguard pending the eradication of the infection from animals, it is recommended that all milk and milk products be pasteurized.
5) It is further considered that international coördination and exchange of information are important and should be effected by the appropriate international agencies.

V) **Cooperation by the Veterinary Profession in Control of Diseases.**—Whereas, many infectious and parasitic diseases of animals, some of which are also communicable to man, may be spread by animal products used for human food; and,

Whereas, the introduction of these diseases into a country reacts against maximum production of food so urgently needed in the world today;

This Congress resolves that veterinary controlling authorities in all countries should be urged to coöperate to the utmost to prevent the spread of these diseases, particularly to those countries in which they do not exist.

VI) **Transportation.**—The 14th International Veterinary Congress learns with satisfaction that steps are being taken by certain international organizations to examine questions of transportation of animals, animal products, vegetable products, and equipment in so far as they relate to the transmission of infectious diseases of livestock.

VII) **International Control of Animal Diseases.**—That this 14th International Veterinary Congress, having directed its attention to the great work which the veterinary profession can do in the control of diseases among the milk, meat, and egg producing livestock of the world, urges the immediate strengthening of this international organization so as to set up an active world-wide body capable of advising governments in the urgent steps necessary to control animal diseases.

The Congress calls upon all national veterinary associations to contribute financially to the development and maintenance of this organization and asks the Permanent Committee to act vigorously in this matter.

VIII) **Government Cooperation in Veterinary Education.**—The 14th International Veterinary Congress, considering:

1) The importance of veterinary science and practice in the field of production and improvement of domestic animals;

2) The advantage for veterinary surgeons particularly concerned with these problems to unite and coordinate their efforts, as has been done with success in some countries;

Recommends:

1) That the government authorities of each country should place at the disposal of veterinary training and research establishments all necessary facilities to further and promote such activities.
2) That in each country, consideration should be given to the setting up of a society of veterinarians and that such societies should be set up wherever possible.

IX) **Breeding.**—In all countries, the problems of inefficient breeding and reproduction in domesticated animals are becoming of increasing economic importance by lowering potential production of food-stuffs of animal origin, and it is essential that the basic skill and scientific knowledge of the veterinarian should be more extensively used to improve fertility and to prevent or overcome infertility among farm livestock and thus contribute toward maximum efficiency in animal breeding.

The 14th International Veterinary Congress, in session in London, August 1949, is conscious of the urgent need to improve and increase scientific research work and instruction in the physiology and pathology of reproduction in the veterinary schools of all countries, so as to ensure that the members of the veterinary profession will play their full share in the application of increased and new knowledge in solving animal breeding problems.

To this end, it urges the governments of all participating countries to take adequate steps to provide increased facilities for this important work, and to utilize to the maximum extent possible the skill and knowledge of veterinarians, and thus make a greater contribution to the world supply of foodstuffs of animal origin.

X) **Rabies.**—This Congress urges all governments to take active steps for the world-wide control and eventual eradication of rabies, through the application of the recognized effective measures, namely, veterinary sanitary regulations, quarantine, elimination of stray dogs, the registration and restraint of dogs, and, where necessary, the annual vaccination of all dogs with approved effective vaccine.

The Congress strongly recommends that international organizations, especially those sponsored by the United Nations, should give active support, and, where necessary, technical assistance to governments for this purpose, and, that they should endeavor to keep the issue prominently before the various governments.

XI) **Films.**—This Congress resolves that the Permanent Committee should elaborate a proposal for the wide distribution of veterinary educational films in all countries and should call upon governments to give adequate grants for the purchase of good talking films recommended by competent veterinary educational authorities.

XII) **Financial Support for International Veterinary Congresses.**—In order that the International Veterinary Congress may be held in all countries, it is resolved, that from all participating countries which are represented in the Permanent Committee, a contribution may be made to a Congress fund, from which, if necessary, the expenses of the printing costs of the Congress, completely or partly, and those of the secretariat of the Permanent Committee, may be paid.

This contribution from each country will be fixed in relation to the number of graduate veterinary surgeons in that country, members of the veterinary organization.

The Congress funds shall be administered by the bureau of the Permanent Committee. The Permanent Committee proposes now that the contribution should be fixed at 1*s*, or its equivalent of that, per year, for each veterinary surgeon in each country.

XIII) **Re: New Version of Paragraph 7 of the By-Laws**—In each country, a permanent national committee should be established, which, in constant cooperation with the organizing committee of the country in question, will carry out the tasks mentioned in this paragraph.

Ways and means of starting this national committee will be left to the veterinary association of the country concerned.

The national committee, once established, will, however, supplement itself from time to time and report its constitution to the secretary of the Permanent Committee. The representatives of a country in the Permanent International Committee will be proposed by the national committee of that country.

The chairman of the national permanent committee and the representative of that country in the Permanent International Committee should, if possible, be one and the same person.

(That is to say, a member in the Permanent Committee representing a country will be the chairman of the permanent national committee).

The duty of national committees shall be to undertake the work of propaganda for the Congress, to enroll members, to obtain subscriptions and to forward them to the Organizing Committee, and to supply information as to the office, rank, and status of individual members of the Congress, especially of the official representatives of authorities, corporations, etc.

XIV) **Re: New Version of Paragraph 6 of the Statutes**—. . . the members of the different countries being chosen on the proposal of the permanent national committees of the countries concerned and shall be nominated by the chief meeting of the Congress by unanimous assent of majority of votes.

The AVMA Office Staff

On December 23, 1949, with calm formality, the staff of the Association's central office gathered for a mid-day luncheon in the Walnut Room of the Congress Hotel in Chicago to celebrate Christmas and the closing of an eventful half century, and to express an earnest hope for a worthy future. The luncheon itself was rendered possible through the personal generosity of Dr. W. G. Brock, chairman of the Executive Board.

The candid camera snapped an event which records a contrast between the office force of the

AVMA of 1950 and that of the first twenty-five years of the century, when all that the Association could afford was obscure desk room in the office of whomever happened to be the secretary. A survey reveals that the AVMA headquarters, editor's office included, moved to widely scattered places every year or two before it finally settled down in Detroit for eleven years (1922-1932), and then moved to Chicago where it still remains.

Until permanent headquarters were established, progress of the Association was slow, discouraging, insufficient, and haphazard. Compared with today's standards, all veterinary medical associations were small, colleges inadequate, coöperation weak, and animal diseases largely uncontrolled.

Because so very few AVMA members have had an opportunity to visit the headquarters of their Association, it is planned to publish an illustrated article in the near future, depicting the layout of the central office. It is hoped that this will give members a better idea of the facilities and equipment required to carry on the day-to-day work of the Association. It is also hoped that the article may stimulate and attract members to visit the office when they are in Chicago. The latchstring is always out at 600 S. Michigan Avenue.

Changes in Committee Personnel

Since the Official 1949-1950 Roster was published (*see* the October, 1949, JOURNAL, pp. 335-342), the following changes in committee appointments have been made by President Zepp:

Committee on Biological Products.—Dr. Glen L. Dunlap replaces Dr. L. R. Vawter as chairman; Dr. Vawter remains on the committee.

Committee on Public Relations.—Dr. L. A. Corwin, 136-21 Hillside Ave., Richmond Hill 18, N. Y., replaces Dr. C. E. DeCamp, who found it necessary to resign from the committee.

Special Committee on Diseases of Food-Producing Animals.—Dr. J. F. Shigley replaces Dr. G. S. Harshfield as chairman of the committee; Dr. Harshfield remains on the committee.

The AVMA Office Staff of 1950

From lower left, clockwise around the table—Dr. J. G. Hardenbergh, executive secretary; Mrs. Evelyn Brewington, financial secretary and chief clerk; Dr. W. A. Young, AVMA treasurer; Mrs. Elaine Bell, editorial assistant; Dr. R. C. Klussendorf, assistant executive secretary; Mrs. Virginia Cronin, subscription department; Mrs. Helen S. Bayless, assistant editor and advertising manager; Dr. C. Don Van Houweling, director of professional relations; Mrs. Eva G. Bailey, editorial assistant; Dr. L. A. Merillat, editor-in-chief; Mrs. Mary Lou Choporis, Dr. Merillat's granddaughter; Mrs. Mary B. Sanem, directory department; Mr. J. J. Shaffer, public relations department; Mrs. Dorothy Yates, applications; Mr. James Calloway, circulation department; Mrs. Jean Foreman, circulation department; Miss Rosalyn Zirlin, secretary; and Miss Lucia Novakovich, secretary.

Public Health Resolution

The Conference of Public Health Veterinarians of the American Public Health Association discussed a number of subjects ranging from atomic energy to the World Health Organization. The members assembled unanimously agreed that "the veterinarian does not have sufficiently broad education to enable him to understand his responsibilities in our changing society." The conference adopted the following resolution and forwarded copies to the deans of all the schools of veterinary medicine in the United States and Canada:

WHEREAS, the daily work of the veterinarian has public health implications, and

WHEREAS, his work brings him in contact with public officials of local, state and federal government, and

WHEREAS, the veterinarian has an obligation toward the people of his community who make his service possible, therefore be it

RESOLVED, that the students in the schools of veterinary medicine receive training to demonstrate the organization of federal, state, and local government with special emphasis on the place of the veterinarian in agriculture and public health. Be it further

RESOLVED, that there be lectures which will emphasize the role of the veterinarian as one of the guardians of the health of his community.

s/JAMES H. STEELE, *Secretary*
RAYMOND FAGAN W. T. S. THORP
FRANK A. TODD

STUDENT CHAPTER ACTIVITIES

Cornell Chapter.—A review of the activities of the Cornell Student Chapter of the AVMA for the fall term of 1949 follows.

Programs for the fall term included:

Dr. Kenneth McEntee, associate professor of veterinary pathology and faculty representative: "What the Student Chapter of the AVMA Means to You."

Dr. R. C. Klussendorf, assistant executive

AVMA Eighty-Seventh Annual Meeting
Aug. 21-24—Miami Beach

—Miami Beach News Bureau

Sight-seeing craft, plying the inland waterways on daily excursions, will be available to members attending the 87th annual session of the AVMA, Aug. 21-24, 1950. The routes afford views of the palatial residences along the waterway banks.

secretary: "The AVMA, the Student Chapter, and You."

Professor R. Albrectsen, Department of Animal Husbandry, New York State College of Agriculture: "The Design of the Artificial Breeding Program."

Colored slides on the veterinary R.O.T.C. Camp, Fort Sam Houston, Texas, were shown by Milton Adsit, senior veterinary student.

The motion pictures "Metrazol" and "Outbreak—Foot-and-Mouth Disease" were shown.

The Christmas party, which featured round and square dancing, was the one social event of this term.

Some further accomplishments of the chapter include the acquisition of a lounge; compilation of a directory of the faculty and staff of the New York State Veterinary College for those attending the conference for veterinarians, Jan. 4-6, 1950; and a pamphlet of helpful hints for incoming students.

Officers of the chapter are Gerald McCarthy, president; Jack Baker, vice-president; Gerald Thorington, secretary; Howard Bo, treasurer; Anson Lewis, senior class representative; George Christensen, junior class representative; Bruce Haynes, sophomore class representative; and Robert Burns, freshman class representative.

S/GERALD L. THORINGTON, *Secretary.*

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Michigan Chapter.—A summary of the 1949 fall-term meetings of the Michigan State College Student Chapter of the AVMA follows:

On October 6, Gail Hawley, a senior veterinary medical student, showed films of his summer vacation in Montana, and salmon fishing in Alaska.

Two 1949 graduates of the College spoke at the meeting on October 20. Drs. William Ball and Orval Krause told about their first four months of practice and the problems they encountered.

Dr. R. C. Klussendorf, assistant executive secretary of the AVMA, discussed "The AVMA, the Student Chapter, and You" on November 3.

Dr. W. H. Mead (M.D.), Lansing, spoke on "The Diagnosis of Neural Diseases" at the November 20 meeting.

At the last meeting of the fall term, December 1, Dr. F. Booth, Elkhart, Ind., talked on "Small Animal Practice" showing illustrations of his own hospital.

The average attendance during the fall term was 225, the highest it has been for many years. Much credit for this is due to Chapter President Roger Brown who was responsible for the well-organized and highly interesting programs.

S/ROBERT M. HAFNER, *Secretary.*

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Missouri Chapter.—At the Nov. 14, 1949, meeting of the Veterinary Club of the University of Missouri, Dr. W. A. Albrecht (Ph.D.), chairman of the Department of Soils at the University, gave a thought-provoking talk on soil fertility and climatic conditions as related to animal diseases. Dr. Albrecht illustrated his address with slides. S/LELAND RICE, *Secretary.*

At the December 12 meeting, Dr. Joseph Knappenberger, of Ashe Lockhart, Inc., Kansas City, gave his views on "The Practice and Application of Veterinary Medicine," and Dr. L. E. Bodenweiser, Kirkwood, discussed "Sterility Problems in Dairy Cattle." Dr. Mark L. Morris, small animal practitioner from New Brunswick, N. J., met with various classes, on December 12, to discuss "General Management and Nutritional Problems of Small Animals."

S/GERALD L. MCKEE, *Publicity Chairman.*

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Washington Chapter.—Speakers at the Dec. 13, 1949, meeting of the Washington State Student Chapter of the AVMA were Dean Nichols, who discussed the progress of the veterinary school, and Mr. Gene Stark, horseman for Hilltop Stables, who spoke on "Care and Management of Horses."

S/RAYMOND REDISKE, *Secretary.*

WOMEN'S AUXILIARY

Mrs. MacDonald, Second Vice-President.—Mrs. H. S. MacDonald, 51 Oakmont Road, Toronto, second vice-president of the Women's Auxiliary to the AVMA, is of Scottish ancestry and was born and reared in Nova Scotia. As second

Mrs. H. S. MacDonald

vice-president, she is responsible for all projects of the Auxiliary, including the loans and awards, for which she signs applications and certificates. To assist veterinary students, the Auxiliary has established the Loan and Awards Fund. A senior

in an accredited veterinary college may borrow up to $200, with interest at 4 per cent. A more recent project has been the establishment of senior awards in all accredited veterinary colleges to the student who has made a special contribution which advances the standing of the veterinary college on the campus.

Another project is to assist in the advancement of the science and art of veterinary medicine. A booklet describing the many ways in which a veterinarian serves his community is available for distribution to interested persons.

s/(MRS. V. H.) FLORENCE MILLER, *President.*

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Arizona Auxiliary.—Wives of members of the Arizona Veterinary Medical Association met at the Hotel Adams in Phoenix on Jan. 4-5, 1950, to organize an auxiliary to the state association. Mrs. J. B. McQuown was chairman of the organizational committee.

s/MRS. J. B. MCQUOWN, *Chairman.*

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Intermountain Auxiliary.—The members of the Women's Auxiliary to the Intermountain Veterinary Medical Association met in the Newhouse Hotel, in Salt Lake City, Utah, on Jan. 16-18, 1950. In addition to the business meeting, members enjoyed a birthday luncheon, theater party, and the Association banquet.

s/MRS. JOHN I. CURTIS, *Secretary.*

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Kentucky Auxiliary.—At the sixth semiannual meeting of the Women's Auxiliary to the Kentucky Veterinary Medical Association at the Country Club in Lexington on Dec. 7, 1949, Mrs. L. J. Stearns was appointed chairman of the program committee for the July, 1950, meeting in Louisville, and Mrs. W. M. Coffee was elected delegate to represent the auxiliary at the Miami Beach meeting of the national auxiliary on Aug. 21-24, 1950. Mrs. Edward Lang, who presided over the meeting, praised Mrs. Houston Cauldemier and Mrs. Joe Stearns as organizers of the group three years ago. Principal speaker was Mrs. D. L. Proctor.

s/MRS. W. M. COFFEE, *Secretary.*

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Nebraska Auxiliary.—The Women's Auxiliary to the Nebraska State Veterinary Medical Association held its annual meeting at the Hotel Cornhusker on Dec. 7-9, 1949. Of the total membership of 112, 98 were registered; this represents a growth of 19 members during the past year.

A luncheon and business meeting were held in the Georgian Room at the Hotel Cornhusker with President Mrs. O. H. Person, Wahoo, presiding. Mrs. Carl Norden, Jr., reported on the Detroit meeting. The following officers were elected: Mrs. H. Gross, David City, president; Mrs. J. D. Cady, Arlington, vice-president; and Mrs. W. F. Monson, Oceola, secretary-treasurer. After the business meeting, Mrs. Carl J. Norden, who was a member of the AVMA tour of Europe last summer, told of some of her experiences and showed colored slides taken on the trip.

Other entertainment included a get-acquainted party, a bridge party, and the annual banquet.

s/MRS. O. H. PERSON, *President.*

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New Hampshire Auxiliary Organized.—Wives of members of the New Hampshire Veterinary Medical Association met on Nov. 29, 1949, at the State House in Concord to organize an auxiliary to the state association. After the business meeting of the association and the auxiliary, Dr. and Mrs. David Hopkins discussed their experiences on the European tour and showed pictures which they had taken.

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Ontario Auxiliary.—Members of the Women's Auxiliary to the Ontario Veterinary Association met at the Chateau Laurier in Ottawa on Jan. 12-14, 1950. After the business meeting, the women enjoyed a tour of Ottawa, theater party, luncheon, and the banquet.

s/MRS. G. C. LAWRENCE, *Secretary.*

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Wisconsin Auxiliary.—The Women's Auxiliary to the Wisconsin Veterinary Medical Association met Jan. 12-13, 1950, at the Schroeder Hotel in Milwaukee. Mrs. Victor H. Miller, Charleston, W. Va., president of the national Auxiliary, was guest speaker at a luncheon and style show in the Empire Room of the Schroeder Hotel. Mrs. Carl A. Brandly, Madison, president of the Wisconsin auxiliary, presided at the business session. Other activities included the banquet, tours of Milwaukee, tea at Watts' China and Glassware Shop, and a visit to Radio Station WMAW.

s/MRS. CARL A. BRANDLY, *president.*

APPLICATIONS

The listing of applicants conforms to the requirements of the administrative by-laws—Article X.

First Listing

COMFORT, COLIN F.
39 Fairview Ave., London, Ont.
D.V.M., Ontario Veterinary College, 1943.
Voucher: G. A. Edge.

GEORGE, FRANK H.
Plain City, Ohio.
D.V.M., Ohio State University, 1916.
Voucher: Fred J. Kingma.

PETERS, MAX R.
Redkey, Ind.
D.V.M., Ohio State University, 1935.
Voucher: W. W. Garverick.

RELKEN, WALTER E.
138-46 Horace Harding Blvd., Flushing, N. Y.
D.V.M., New York State Veterinary College, 1938.
Voucher: J. J. Regan.

THOMPSON, PAUL L.
321 E. South St., Freeport, Ill.
D.V.M., Iowa State College, 1949.
Voucher: A. G. Misener.

Second Listing

HAGGARD, C. H., Luverne, Minn.
SIEGMUND, OTTO H., Camp Detrick, Frederick, Md.
STANFORD, MALCOLM F., Rt. 2, Fayetteville, Ark.

Iowa State College

WILSON, SANFORD B., D.V.M., St. Croix Falls, Wis.

U. S. GOVERNMENT

Dr. Husman New President of Federal Veterinarians.—Dr. Adam A. Husman (CIN '17) Raleigh, N. Car., was elected president of the National Association of Federal Veterinarians at the thirty-second annual meeting in Columbus, Ohio, Oct. 12, 1949. Dr. Husman, in his work with the Bureau of Animal Industry, has served in campaigns against foot-and-mouth disease, dourine, tuberculosis, and tick eradication. In January, 1924, he was assigned to hog-cholera work in North Carolina and was later made assistant inspector in charge; in 1934, he was made inspector in charge. The brucellosis program in North Carolina, under the management of Dr. Husman, enabled it to become the first brucellosis-accredited state in the Union.

Dr. Husman is a member and past president

Dr. A. A. Husman

of the North Carolina Veterinary Medical Association. A past president and, since 1946, secretary of the Southern Veterinary Medical Association, Dr. Husman is also a past vice-president of the AVMA and has served in the House of Representatives of the AVMA for sixteen consecutive years.

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Dr. Skidmore Retires.—Dr. Don I. Skidmore (OSU '04) has retired after more than forty-four years of service with the U.S. Bureau of Animal Industry. He was in charge of the Division of Virus Serum Control at the time of his retirement.

Dr. Skidmore was assigned as assistant inspector in the meat inspection service in the BAI in August, 1905, at South St. Joseph, Mo. He had similar assignments in Indianapolis and Evansville, Ind., and Dayton, Ohio. At Dayton, he also performed tuberculin and mallein testing. In 1914, he was transferred to the then new project of hog-cholera control. After special training in this field, Dr. Skidmore was transferred to virus-serum control work at Kansas City, Kan., and then to special duty in Washington, D. C., to assist in administering the Virus-Serum-Toxin Law.

When the Division of Virus-Serum-Control was established in 1920, Dr. Skidmore was placed in charge and held that position until his retirement. Dr. Skidmore is an authority on the preparation of veterinary biological products and has contributed to the development of improved methods of producing them.

AMONG THE STATES AND PROVINCES

Alabama

Veterinary Medicine Recognized.—"The layman visitor to the sessions (of the Southern Veterinary Medical Association). . . cannot escape the general feeling among the veterinarians that their business is concerned vitally with the health of the public."

This is a portion of an editorial in the *Birmingham Age-Herald* for Nov. 9, 1949, which appeared during the meeting of the Southern Veterinary Medical Association.

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Southern Association Officers.—Officers of the Southern Veterinary Medical Association elected for the ensuing year are as follows: Drs. Taylor P. Rowe, Richmond, Va., president; M. K. Heath, Birmingham, Ala., president-elect; F. M. Kearns, Louisville, Ky., first vice-president; C. C. Rife, Atlanta, Ga., second vice-president; A. A. Husman, Raleigh, N. Car., secretary; M. R. Blackstock, Spartanburg, S. Car., treasurer; John Gadd, Towson, Md., director; and W. G. Brock, Dallas, Texas, director.

s/A. A. HUSMAN, *Secretary.*

Arizona

State Association.—The annual meeting of the Arizona Veterinary Medical Association was held in the Hotel Adams, Phoenix, on Jan. 4-5, 1950. The scientific program follows.

Dr. C. H. Ozanian, Bellflower, Calif.: "Diagnosis and Treatment of Ailments Among 100,000 Dairy Cattle."

Dr. J. R. Dinsmore, Portland, Ore.: "Clinical Anesthesia in Small Animals."

Dr. J. B. Ward (M.D., M.P.H.), state director of public health, Phoenix: "Veterinary Medicine and Public Health."

Dr. J. Micuda, Phoenix: "Veterinary Practice in the Hawaiian Islands."

Dr. C. J. Prchal, U. S. Bureau of Animal Industry, Phoenix: "Coccidioidal Granuloma."

Dr. P. R. Baird, Waterville, Maine: "The Veterinarian and Public Relations."

Dr. W. J. Pistor, University of Arizona, Tucson: "Newcastle Disease."

Drs. Paul McQuown, Tucson; Vego Mikkelson, Phoenix; and Charles White, Mesa; participated in a symposium on "Internal and External Fixation of Fractures of Small Animals." The discussion was led by Dr. J. R. Dinsmore.

S/FRANK G. HAMILTON, *Secretary.*

Arkansas

Artificial Insemination.—In response to the editorial comment in the September, 1949, JOURNAL, page 193, titled "A Neglected Opportunity" and which, by the way, was credited to Dr. J. B. Herrick although really being a part of the work of the Committee on Veterinary Services, we have the following comment from Dr. J. A. Pulliam, Jonesboro, Ark.:

"The explanation for the small number of veterinarians engaged in artificial insemination is quite simple. It is essentially a financial reason. Lay technicians can be employed for less money than can professional men."

The letter goes on to point out that very few men are crusaders for a cause to the extent of self-sacrifice. Therefore, a veterinarian seeking a place to practice or an outlet for his ability and training is likely to enter fields other than those of artificial insemination, simply because he cannot compete on a remuneration basis with a layman who has little or no college training. This would be true whether the veterinarian is a recent graduate and becoming established for the first time, or whether he is a veterinarian who has been in practice and already has established a clientele.

The farmers who own the cattle needing insemination are also bargain hunters. They shop around for the service which they can secure for the least expenditure of money. Therefore, the problem is basically one of remuneration. The owners of cattle shop for the cheapest service, and the veterinarian cannot compete with the untrained or partly trained layman on this basis.

California

Midwinter Conference.—The midwinter conference of the California State Veterinary Medical Association was held Jan. 9-11, 1950, at the California State Polytechnic College, with conference headquarters at the Anderson Hotel, San Luis Obispo. The program follows. Speakers not otherwise identified are members of the staff of the University of California.

Dr. W. M. Coffee, La Center, Ky., president-elect, AVMA: "What the American Veterinary Medical Association Means to Veterinarians" and "General Practice" (with illustrations).

Dr. S. T. Michael, San Francisco: "Veterinary Ethics."

Drs. P. D. DeLay, Division of Animal Industry, State Department of Agriculture, Sacramento, moderator; B. Dean, State Department of Public Health, San Francisco; and J. Enright discussed "Virus Diseases of Animals Transmissible to Man."

The Rabies Control Programs were discussed by Drs. E. R. Quortrup, "San Diego County"; J. H. Bower, "Orange County"; and W. C. Bateman, "San Bernardino County."

Dr. T. J. Hage: "Diethylcarbamazine in the Treatment of Heartworms in Dogs."

Dr. W. O. Brinker, Department of Surgery and Medicine, School of Veterinary Medicine, Michigan State College, East Lansing: "The Use of Intramedullary Pins in Small Animals" and "Clinical Notes."

Drs. G. C. Green and K. R. Wilcox, Los Angeles: "Hospital Methods."

Dr. J. E. Craige, Seaside: "Laboratory Diagnosis of Intestinal Infection" (with illustrations).

Dr. W. K. Riddell, Los Angeles: "Diagnosis and Treatment of Diseases of the Urinary Tract."

Dr. T. A. Berry, Berkeley: "Clinical Manifestations of Diseases Due to a Pathological Urinary Tract."

Dr. G. E. McClintock, West Hollywood: "Simple Laboratory Methods Available to Practitioners for Use in Hospitals."

Dr. E. C. Baxter, Los Angeles: "Interpretation of Laboratory Reports."

Dr. E. W. Paul, Redwood City: "Treatments Available to Correct Pathological Findings."

Dr. M. A. Emmerson, Division of Veterinary Obstetrics, Iowa State College, Ames: "Trichomoniasis in Cattle and Its Control" and "X-Ray Therapy of Some Diseases of Animals."

Dr. A. C. Rosenberger, Stockton: "Cattle Scabies Eradication" (with illustrations).

Dr. J. F. Winn, U. S. Public Health Service, Communicable Disease Control, Atlanta, Ga.: "Source of Q Fever Antibodies in Calves."

Dr. C. H. Ozanian, Bellflower: "Atypical Acetonemia in Cattle."

Dr. E. F. Chastain, Los Angeles: "Eradication of Cattle Fever Ticks."

Dr. K. G. McKay was moderator of a panel discussion "Bovine Sterility." Other members of the panel were Drs. Raymond B. Cowles; S. A. Fuller, Arcata; W. M. Thorning, Redwood City; and R. Ormsbee, Stockton.

Dr. W. M. Mohler, Pathological Division, U. S. Department of Agriculture, Washington, D. C.: "Diagnosis of Anaplasmosis Through Complement-Fixation."

Dr. S. A. Peoples (M.D.), Davis: "Recent Advances in Veterinary Pharmacology."

S/CHARLES S. TRAVERS, *Secretary.*

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Wool Growers Oppose Research Laboratory.

—At its annual meeting in San Francisco, Nov. 17-18, 1949, the California Wool Growers Association passed resolutions urging continued vigilance to keep foot-and-mouth disease out of the United States and a redoubling of efforts to eradicate it from Mexico, but opposing the establishment of a foot-and-mouth disease research laboratory in the United States.

Connecticut

Fairfield County Association.—The following officers were elected at the business meeting of the Fairfield County Veterinary Medical Association at the Parker House, Newtown, on Dec. 16, 1949: Drs. Chester E. Guthrie, president; Walter B. Holcomb, president-elect; and William R. Leggett, reëlected secretary-treasurer. The Executive Committee consists of these officers and Drs. W. F. Vail, Andrew Draper, and R. Strasburger. Members of the Committee on Ethics are Drs. George G. Pickett, Joseph M. Fell, Robert A. Rands, Saul S. Spitzberg, and Leonard A. Schulhof.

s/W. R. LEGGETT, *Secretary.*

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Personal.— Dr. Frank E. Blake of the U. S. Department of Agriculture, with headquarters in the state office building, Hartford, resigned Nov. 1, 1949, after 35 years of continuous government service. Most of his time was spent on tuberculosis eradication. Dr. Blake has been a member of the AVMA for many years.

Delaware

State Association.—Members of the Delaware Veterinary Medical Association met in Newark at the College Inn on Dec. 15, 1949. The following program was presented.

Dr. C. A. Woodhouse, Newark: "The Detroit Meeting."

Dr. A. L. Brueckner, director, State Livestock Sanitary Service: "Rabies."

Dr. L. J. Poelma, chief of laboratory, Maryland Livestock Sanitary Service, College Park, "Anaplasmosis."

Dr. J. L. Cherry, State Board of Health, Dover: "New State Milk Regulations."

New officers of the association are Drs. C. C. Palmer, Newark, president; and E. L. Symington, Newark, secretary-treasurer.

s/C. C. PALMER, *Secretary.*

Hawaii

Personal.—Dr. Ernest H. Willers, territorial veterinarian of Hawaii, received the thirty-third degree of the Scottish Rite of Free Masonry. Dr. Willers is also past exalted ruler of the Honolulu Lodge of Elks and past district deputy of Elks.

s/PAUL T. NOMURA, *Resident Secretary.*

Idaho

Southwest Association.—On Dec. 7, 1949, the Southwest Idaho Veterinary Medical Association met in Emmett. Dr. John Williams, Caldwell, discussed "Vaccination Program for Brucellosis." Members participated in a round table discussion of problems encountered in the Boise Valley. Association officers are Drs. R. C. Derrer, Meridian, president; and A. P. Schneider, Boise, secretary-treasurer.

The women were entertained at the home of Dr. and Mrs. P. Eldredge.

s/A. P. SCHNEIDER, *Secretary.*

Illinois

Chicago Association.—Dr. Mark Morris, Brunswick, N. J., discussed "Nutrition in Animals in Health and Disease" at the Dec. 13, 1949, meeting of the Chicago Veterinary Medical Association at the Palmer House.

s/ROBERT GLOVER, *Secretary.*

Indiana

State Association.—The sixty-sixth annual meeting of the Indiana Veterinary Medical Association was held in the Severin Hotel, Indianapolis, on Jan. 12-14, 1950. The following program was presented.

Dr. R. E. Ruggles, Moline, Ill.: "Practical Management of Problems Facing the Small Animal Practitioner."

Dr. W. W. Armistead, School of Veterinary Medicine, Ohio State University, Columbus: "Heartworms" and "Sutures and Suture Material."

Dr. W. L. Boyd, Division of Veterinary Medicine, University Farm, St. Paul, Minn.: "The Relation of the Veterinarian to the Program of Artificial Insemination of Dairy Cattle" and "The Treatment of Retained Fetal Membranes and Their Sequela in the Cow."

Dr. B. S. Pomeroy, Division of Veterinary Medicine and Poultry Research, University Farm, St. Paul, Minn.: "Use of Sulfonamides in Poultry Diseases" and "Our Present Day Information of Pullorum and Newcastle Disease."

Dr. Robert Curtis, Portage, Wis.: "A practitioner Treats Mastitis" and "Observations on Brucellosis Control."

Dr. C. Don Van Houweling, director of professional relations, AVMA, Chicago: "Public Relations."

Dr. J. T. Burriss, president, Associated Serum Producers, Inc., Columbus, Ohio: "Public Relations."

Mr. A. V. Grindle, Indianapolis: "Indiana Veterinary Medical Association Public Relations Counsel."

Dr. J. R. Davis, Franklin: "Public Relations Committee Report."

Dr. L. T. Railsback, Ellsworth, Minn.: "Dystocia in the Sow" and "Swine Practice."

Dr. Frank Thorp, Jr., Michigan State College, East Lansing: "The Relation of Nutrition to Swine Enteritis" and "Differential Diagnosis of Troublesome Sheep Diseases."

Mr. W. M. Beeson, Animal Husbandry Depart-

ment, Purdue University, Lafayette: "Some New Factors Affecting the Nutrition of Farm Animals."

Dr. L. M. Hutchings, Department of Veterinary Science, Purdue University: "Infectious Diseases of Young Pigs."

The following films were shown: "Local Anesthesia"; "Intramedullary Pinning," discussed by Drs. Armistead and Ruggles; and "Ear Trim," "Pyometria," "Haw Operation," "Spays," and "Furious Rabies in the Cat," all discussed by Dr. H. E. Jensen, director, Wiseman Animal Hospital, Cleveland, Ohio.

s/WADE W. GARVERICK, *Secretary.*

Iowa

Dr. Shoeman Stresses Feed Industry Relations.—As a step toward promoting closer cooperation between feed dealers and veterinarians, Dr. J. E. Shoeman, president of the Iowa Veterinary Medical Association, recently took part in a radio interview on livestock nutrition.

The interview, broadcast from Atlantic, Iowa, was featured on "Let's Go Visiting," a farm program sponsored by Wayne feeds. Announcer Med Maxwell opened the program with a tribute to practicing veterinarians throughout

Dr. J. E. Shoeman (left) being interviewed by Med Maxwell at Atlantic, Iowa, on "Let's Go Visiting."

the nation, after which Dr. Shoeman answered questions on the activities of his state association and discussed public health aspects of brucellosis. In the latter half of the program, Dr. Shoeman pointed out the need for better nutrition for all classes of livestock and how the feed industry is helping to meet this need.

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Personals.—Dr. (ONT '92) and Mrs. John W. Griffith, Cedar Rapids, celebrated their golden wedding anniversary on Dec. 20, 1949. Dr. Griffith retired from active practice in Cedar Rapids after more than fifty years of service to his community.

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Dr. Bert O. Combs (ISC '47), former assistant to Dr. R. R. Dappen (KCVC '17), Brooklyn, N. Y., has taken over the general practice of Dr. D. B. Radloff (ISC '39), Conrad. Dr. Radloff has accepted a position on the faculty of Iowa State College, Ames.

s/LAURANCE P. SCOTT, *Secretary.*

Kansas

Dr. Twiehaus Joins State College Faculty.—Dr. Marvin J. Twiehaus (KSC '36), was appointed as assistant professor of pathology at Kansas State College School of Veterinary Medicine, effective Dec. 1, 1949.

After receiving his D.V.M. degree, Dr. Twiehaus was employed in field and laboratory work by the U. S. Bureau of Animal Industry for a year. He then joined the Kansas State College faculty as instructor in bacteriology and operator of the poultry diagnostic laboratory. From 1941 to 1946, Dr. Twiehaus was with the Fifth Army Mobile Medical Laboratory unit in the South Pacific and New Zealand as a member of the U. S. Army Veterinary Corps. Since his separation from the Army, he has been in private practice at St. Charles, Mo. The duties of his new position will include special research on brucellosis.

s/E. E. LEASURE, *Dean.*

Kentucky

Short Course.—The Kentucky Veterinary Medical Association presented its twenty-third annual short course for veterinarians at the University of Kentucky, Lexington, on Dec. 7, 1949. The scientific program follows.

Dr. Durward Olds, Dairy Department: "Bovine Sterility."

Dr. A. C. Todd, Animal Pathology Department: "Preventive Treatment for Bloodworm Infection."

Dr. Ross Brown, Animal Pathology Department: "Baby Pig Anemia."

Dr. Merle F. Hansen, Animal Pathology Department: "Hematology of the Thoroughbred."

Drs. E. L. Taylor, Georgetown, and D. E. Labore, Cynthiana: "Sore Mouth in Cattle."

Dr. W. M. Coffee, La Center, president-elect of the AVMA: "General Practice" (with illustrations).

Dr. Ralph Elliott, Dairy Department: "The Role of Nutrition in Sterility."

Mr. Peter N. Jans, broker, Chicago, Ill.: "Veterinary Group Insurance."

s/ROSS BROWN, *Secretary.*

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Dr. W. M. Coffee, president-elect of the AVMA, demonstrating his technique for direct blood transfusion through the use of the Shikles syringe. This demonstration took place at the annual clinic of the Northeast Mississippi Veterinary Medical Association at Corinth. (This technique was described in the September, 1949, JOURNAL, page 165).

Maryland

State Association.—The Maryland State Veterinary Medical Association met at the Hotel Emerson in Baltimore on Dec. 16-17, 1949. The program follows.

Dr. Leo J. Poelma, College Park, Md.: "Stomatitis of Undetermined Etiology."

Dr. Edward Weatherby, manager, Maryland Artificial Breeding Coöperative, College Park: "Artificial Breeding in Maryland."

Dr. Raymond Curry, Washington, D. C.: "Auditory Surgery in Dogs."

Dr. D. W. Gates, Animal Disease Station, Beltsville: "Anaplasmosis."

Dr. E. A. Churchill, Department of Veterinary Surgery and Obstetrics, University of Pennsylvania, Philadelphia: "Radiographic Interpretations" and "Bovine Surgery."

Dr. A. L. Brueckner, director, Livestock Sanitary Service, College Park, Md.: "Regional Veterinary Education."

Dr. John Fowble, Timonium: "Ethics."

Dr. John T. McGrath, Department of Veterinary Pathology, University of Pennsylvania, Philadelphia: "Disturbances of Locomotion in Dogs Due to Spinal Lesions."

Dr. Arthur V. Bartenslager, Stewartstown, Pa.: "Bovine Sterility."

Dr. A. Henry Craig, College Park, Md.: "Milk Fever."

s/J. WALTER HASTINGS, SR., *Secretary.*

Massachusetts

State Association.—The regular monthly meeting of the Massachusetts Veterinary Association was held Dec. 21, 1949, at the Hotel Statler in Boston. "The Care and Schooling to the American Saddle Horse" was discussed by Dr. Francis Austin, Belchertown, and Dr. David K. Detweiler, University of Pennsylvania, Philadelphia, presented a paper on "Diagnosis and Treatment of Common Heart Diseases in the Dog." Both talks were illustrated.

s/C. LAWRENCE BLAKELY, *Secretary.*

Michigan

Western Association.—The West Michigan Veterinary Medical Association met in the Hart Hotel, Battle Creek, Dec. 8, 1949. A panel discussion on "Compulsory Veterinary Internship as a Prerequisite for Licensing" was held, with Dr. Allen Begg as moderator. Other members of the panel were Dean C. S. Bryan, Drs. Louis La Fond, Paul V. Howard, and a senior student from the School of Veterinary Medicine, East Lansing, Gail Hawley. A lively discussion from the floor followed the formal presentation.

Sickness and disability insurance for junior and senior veterinary students was discussed and referred to a committee.

s/GLEN REED, *Secretary.*

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Dr. Davisson Appointed State Veterinarian.—Dr. Lee Davisson (CVC '10) has been appointed state veterinarian to succeed Dr. C. F. Clark who resigned in August, 1949.

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Dr. Stocking Joins Upjohn Staff.—Dr. Gordon G. Stocking (MSC '46) recently joined the staff of the Upjohn Medical Division's Department of Veterinary Medicine. Dr. Stocking has been employed, since receiving his D.V.M. degree, at the Upjohn Richland Farms, where he was in charge of all veterinary activities. He is a member of the AVMA, the Michigan State Veterinary Medical Association, the Horse Breeders' Association of America, and is a director of the Mid-West Arab Horse Breeders' Association.

Mississippi

Personal.—Dr. R. M. Crockett (TEX '45), formerly with Starnes Animal Hospital, Dallas, Texas, is now associated with Dr. J. R. Broussard, Jr. (API '47), at the McComb Animal Hospital, McComb, Miss.

Missouri

Kansas City Association.—Dr. A. H. Groth (ISC '31), director of the College of Veterinary Medicine, University of Missouri, was guest speaker at the November 15 meeting of the Kansas City Veterinary Medical Association. Dr. Groth, who has had wide and varied experience in various phases of veterinary medicine, discussed "Johne's Disease."

s/E. M. MUNDELL, *Secretary.*

Nebraska

State Association.—The fifty-third annual meeting of the Nebraska Veterinary Medical Association was held in the Cornhusker Hotel,

Lincoln, on Dec. 7-9, 1949. The program follows.

Dr. J. D. Shoeman, president, Iowa Veterinary Medical Association, Atlantic: "Veterinary Business Management." Dr. D. F. Walker, Broken Bow, led the discussion of this paper.

Dr. W. F. Irwin, Tulsa, Okla.: "Bone Surgery in Small Animals." Dr. V. J. Brandt, Scottsbluff, led the ensuing discussion.

Dr. J. W. McGinnis, Ord: "Problems in Cattle Practice." The discussion was opened by Dr. J. L. George, Chester.

Drs. J. D. Ray, Omaha, and Carl J. Norden, Sr., Lincoln: "The International Veterinary Congress" (with illustrations).

Dr. F. R. Woodring, Department of Animal Pathology and Hygiene, University of Nebraska, Lincoln: "Newcastle Disease in Chicks from Vaccinated and Nonvaccinated Hens."

Dr. Carl Olson, Jr., Department of Animal Pathology and Hygiene, University of Nebraska: "Observations on Hyperkeratosis (X Disease)." Dr. E. W. Peck, Auburn, led the discussion of this paper.

Dr. H. C. H. Kernkamp, University of Minnesota, St. Paul, conducted a round table discussion on "Diseases of Livestock." Others who participated were Drs. T. C. Campbell, Norfolk; F. W. Hansmire, Fairbury; Fred Knapple, Lexington; J. H. Magilton, David City; and C. H. Hoekstra, Omaha.

Officers elected at the business meeting are Drs. J. L. George, Chester, president; O. E. Walgren, Platte Center, vice-president; Ordella Geisler, Lincoln, secretary-treasurer; and Paul L. Matthews, Omaha, resident state secretary, AVMA. Dr. W. F. Monson, Osceola was elected delegate to the House of Representatives of the AVMA and Dr. W. I. Nelson, Herman, as alternate.

s/L. V. SKIDMORE, *Secretary.*

New Mexico

State Association.—The seventeenth annual meeting of the New Mexico Veterinary Medical Association was held at Roswell on Oct. 17-18, 1949. The program follows.

Dr. E. R. Frank, Kansas State College, Manhattan: "Diseases and Surgery of Large Animals" and "Bovine Sterility."

Dr. Chas. Bower, Topeka, Kan.: "Small Animal Diseases" and "Small Animal Nutrition."

Dr. W. P. Hardy, Texas Experiment Station, Sonora: "Sheep Diseases" and "Poisonous Plants."

Dr. W. F. Irwin, Tulsa, Okla.: "Small Animal Diseases" and "Interesting Cases in Small Animal Practice."

Dr. Mark Welsh, Pearl River, N. Y.: "What's New in Drugs for the Veterinarian."

Drs. C. Bower and W. F. Irwin were moderators of a panel discussion on small animal problems.

Dr. E. E. Kraus, Clovis, was moderator of a panel discussion on large animals.

Officers of the association are Drs. Fred Neal, Roswell, president; E. J. Smith, Santa Fe, vice-president; and J. Dowds, Tucumcari, secretary-treasurer. s/S. W. WIEST, *Resident Secretary.*

New York

Conference for Veterinarians.—The forty-second annual conference for veterinarians of the New York State Veterinary College, Cornell University, Ithaca, was held at the College on Jan. 4-6, 1950. The following scientific program was presented. Speakers not otherwise identified are from the staff of the veterinary college.

Dr. E. P. Leonard: "Eye Surgery."

Drs. M. E. Miller and G. C. Christensen: "Anatomical Facts of Use to the General Practitioner."

Mrs. P. H. Larsen and Dr. H. L. Gilman: "Aureomycin Therapy in Bovine Brucellosis."

Dr. J. E. Greene, Department of Small Animal Surgery and Medicine, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn: "Therapy in Liver Dysfunction" and "The Intramedullary Pin" (both illustrated).

Dr. J. R. M. Innes, U. S. Public Health Service, National Institutes of Health, Bethesda, Md.: "Nervous Disorders of Ruminants." (with illustrations) and "The Relationship of Infection to the Etiology of the Canine Encephalopathies."

Dr. H. E. Kemper, inspector in charge, Zoological Division, Bureau of Animal Industry, Southwestern Division, Albuquerque, N. M.: "Methods of Control for Lice and Other External Parasites of Cattle in the Southwest."

Dr. E. V. Moore, Department of Agriculture and Markets, Albany: "Bovine Brucellosis Control."

Dr. F. W. Schutz, Brewster: "Mastitis Program: Practitioner's Viewpoint."

Drs. H. G. Hodges and S. D. Johnson: "Mastitis Program: Treatment."

Dr. A. C. Ivy (Ph.D., M.D.), Chicago Professional Colleges, University of Chicago: "The Relation of Nutrition to Age."

Dr. W. A. Aitken, Merrill, Iowa: "Problems in Surgery and Obstetrics" and "Large Animal Practice."

Dr. C. P. Zepp, Sr., New York, N. Y., president of the AVMA: "Obstinate Skin Diseases of the Dog" (with illustrations), and "The Duties and Value of Veterinary Organization."

Colonel Elbert DeCoursey, M.C., Commandant Army Medical Center, Army Medical Department Research and Graduate School, Washington, D. C.: "Pathological Effects of Nuclear Explosion."

Drs. K. R. Reinhard; W. F. Tierney, Sennett; S. J. Roberts; and J. A. Baker: "Leptospirosis in Cattle in New York State."

Dr. I. W. McDonald, Cambridge University, England: "Some Recent Observations on Digestion in Ruminants."

Dr. J. A. Henderson, Department of Medicine, Ontario Veterinary College, Guelph, Canada: "Sterility Problems in South American Cattle."

Dr. W. A. Hagan, dean, New York State Veterinary College: "The Veterinary Profession in Some European Countries."

Dr. J. A. Dye and Mrs. Esther L. McCandless: "Modern Conceptions of Ketosis in Cattle."

Dr. A. M. Mills: "Case Reports from the Department of Surgery."

Drs. S. J. Roberts, H. L. Gilman, and Mrs. P. H. Larsen: "Vibrionic Infection in Relation to Abortion and Sterility in Cattle.

s/W. A. HAGAN, *Dean.*

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New York City Association.—At the Dec. 14, 1949, meeting of the Veterinary Medical Association of New York City, Dr. I. D. Wilson, Department of Biology, Virginia Polytechnic Institute, Blacksburg, presented a paper on "Veterinary Education South of the Border" (with illustrations), and Dr. C. P. Zepp, Sr., president of the AVMA, discussed "Activities of the AVMA." Officers elected at this meeting are Drs. Irving E. Altman, president-elect; and C. R. Schroeder, secretary-treasurer. The Executive Committee consists of Drs. J. A. Millar, R. S. MacKellar, Jr., and S. S. Miller. Dr. L. W. Goodman was appointed as representative to the state executive board. Members of the Committee on Ethics are Drs. H. E. Grossman, chairman, S. Nathanson, L. Barto, Irene Kraft, C. P. Zepp, Jr., J. A. Ward, M. W. Firestone, and F. O. Wright.

The program of the Jan. 4, 1950, meeting featured a discussion of "Canine Encephalitis." Speakers were Drs. Hilary Koprowski (M.D.), George A. Jervis (M.D.), Arthur F. North, Jr., B. J. Finkelstein, and Frank Bloom. Mr Frederic Newell, Associated Hospital Service of New York, discussed "The Hospital-Sponsored Blue Cross Plan."

s/C. R. SCHROEDER, *Secretary.*

North Carolina

Roanoke-Tar Association.—On Dec. 2, 1949, the Roanoke-Tar Veterinary Medical Association met in Rocky Mount to discuss local practitioner problems. This association represents eastern North Carolina. Officers elected at the December meeting are Drs. T. A. Monk, Jr., Ahoskie, president; and G. L. Gilchrist, Farmville, secretary-treasurer.

s/J. H. BROWN, *Resident Secretary.*

North Dakota

Damages Awarded for Brucellosis.—A tenant moved to a farm and brought 10 dairy cows with him. These animals had been tested and found to be negative to the brucellosis test. The landlord furnished 10 additional dairy cows. Upon being questioned, he reported that they were from a tested herd. Some time later, 1 of the cows brought to the farm by the owner calved prematurely and it later developed that she was the means of introducing brucellosis into the herd.

The landlord was found guilty of bringing in animals which had not been duly tested, and a jury awarded the tenant damages in the amount of $2,500. This is probably the first case of this type on record in North Dakota.

s/T. O. BRANDENBURG.

Ontario

Provincial Association.—The seventy-sixth annual meeting of the Ontario Veterinary Association was held in the Chateau Laurier, Ottawa, on Jan. 12-14, 1950. The scientific program follows.

Dr. M. R. Clarkson, Inspection and Quarantine Division, Bureau of Animal Industry, Washington, D.C.: "The Foot-and-Mouth Disease Situation in Mexico." Dr. R. V. Walker, Animal Diseases Research Institute, Hull, Que., led the discussion of this paper.

Dr. J. Markowitz (M.D.), University of Toronto: "The Function of the Hepatic Artery in the Dog." The ensuing discussion was led by Dr. J. W. Leeson, Toronto.

Dr. Thurber LeWin (M.D.), University of Buffalo, N.Y.: "External Diseases and Injuries of the Eye." The paper was discussed by Dr. W. C. Reid, Fort Erie, Ont.

Dr. S. J. Roberts, New York State Veterinary College, Ithaca: "Bovine Obstetrical Problems." The paper was discussed by Dr. E. F. Johnston, Carp, Ont.

Dr. A. Secord, Toronto, Ont., led a panel discussion on "Small Animal Practice."

Dr. Gerry B. Schnelle, assistant chief of staff, the Angell Memorial Animal Hospital, Boston, Mass.: "X-Ray Diagnosis in Small Animals." Dr. A. E. Broome (M.D.), radiologist, Ontario Veterinary College, led the discussion of Dr. Schnelle's paper.

Dr. G. A. Edge, Ontario Department of Health was moderator of a panel discussion on "Veterinary Public Health."

Dr. L. P. Doyle, Department of Veterinary Science, Purdue University, Lafayette, Ind.: "Some Important Swine Diseases." Dr. Doyle's paper was discussed by Dr. R. A. McIntosh.

Dr. J. F. Crawley, Connaught Laboratories, and K. L. McGregor, Ontario Veterinary College and Cattle Breeding Association, Waterloo, Ont.: "Bovine Vaginitis—Preliminary Observations."

Dr. R. A. McIntosh was moderator of a panel discussion on "Large Animal Practice."

s/G. A. EDGE, *Secretary.*

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Animal Health in Canada.—Although compensation or indemnity is paid for animals slaughtered because of glanders, hog cholera, dourine, and tuberculosis in Canada, only the last named disease has been listed among those for which indemnities have been claimed. Hog cholera indemnities were last claimed in 1946, glanders indemnities in 1937, and dourine indemnities in 1919.

Pennsylvania

Conference of Veterinarians.—The fiftieth annual conference of veterinarians of the University of Pennsylvania, School of Veterinary Medicine, met in Philadelphia on Jan. 3-4, 1950. The scientific program follows. Speakers not otherwise identified, are from the staff of the School of Veterinary Medicine.

Dr. Monica Reynolds (Ph.D.): "Fluid Therapy for the Dehydrated Animal."

Dr. C. P. Zepp, Sr., New York City, president of the AVMA: "Obstinate Skin Diseases of the Dog" (with illustrations) and "Facts About the AVMA."

Dr. Arthur D. Goldhaft, Vineland Poultry Laboratories, Vineland, N. J.: "A Consideration of the Poultry Industry and Poultry Diseases from an International Standpoint."

Dr. Mark W. Allam: "Foreleg Paralysis in the Dog" (with illustrations).

Dr. Firman E. Bear (Ph.D.), chairman, Soils Department, Rutgers University, New Brunswick, N. J.: "The Soil in Relation to Animal Diseases."

Mr. C. J. Babcock, Research Division, Production and Marketing Administration, U.S. Department of Agriculture, Washington, D.C.: "Facts and Factors of Importance in the Inspection and Grading of Market Milk."

Dr. C. P. Bishop, director, Bureau of Animal Industry, Harrisburg, and president, U. S. Livestock Sanitary Association: "The Revised Program for the Control and Eradication of Bovine Brucellosis in Pennsylvania."

Dr. D. K. Detweiler: "The Diagnosis and Treatment of Congestive Heart Failure in the Dog." Dr. Detweiler also showed the film "Cardiac Arrhythmias" through the courtesy of Abbott Laboratories.

Dr. John T. McGrath: "Clinical Examination of the Nervous System of the Dog with Reference to Some Pathological Entities" (with illustrations).

Colonel Elbert DeCoursey, M.C., Army Medical Department, Research and Graduate School, Army Medical Center, Washington, D.C.: "The Pathological Effects of Nuclear Explosion."

Dr. C. R. Schroeder, Lederle Laboratories, Pearl River, N. Y.: "Aureomycin."

Dr. W. R. Haubrich, Claremont, N. H.: "Bovine Infertility."

Dr. Roger J. Maloney: "Roentgenologic Diagnosis of Some Diseases of Bone."

Dr. Ryland Croshaw, Columbus, N. J.: "Recent Experiences with Screwworm Infestation in New Jersey."

Dr. Harry M. Martin: "The Life History and Economic Importance of the Screwworm Fly."

Dr. Donald G. Lee: "The Anatomy of the Ischiorectal Fossa of the Dog with Special Reference to Perineal Herniation."

s/JOHN D. BECK, *Chairman.*

Tennessee

Eastern Society.—The East Tennessee Veterinary Society met on Dec. 10, 1949, in Knoxville. The program featured a round table discussion of brucellosis and other ailments affecting livestock of eastern Tennessee. At the business session, the following officers were elected: Drs. H. L. Lamb, Athens, president; Dennis Sikes, Knoxville, vice-president; and G. E. Eason, Kingsport, secretary-treasurer.

s/D. COUGHLIN, *Resident Secretary.*

Texas

New President at A. & M.—Dr. M. T. Harrington (Ph.D.), formerly dean of the School of Arts and Sciences, and acting dean of A. & M. College of Texas, has been named sixteenth president of the College. He is the first former student to be elected to this position. Mr. Bolton, whom Dr. Harrington succeeds, is on modified service after forty-one years on the college staff.

Utah

Intermountain Association.—The twenty-second annual meeting of the Intermountain Veterinary Medical Association was held at the Newhouse Hotel in Salt Lake City on Jan. 16-18, 1950. The scientific program follows.

Dr. W. M. Coffee, La Center, Ky., president-elect of the AVMA: "The AVMA and the Veterinarian" and "General Practice" (with illustrations).

Dr. M. A. Emmerson, Department of Veterinary Obstetrics, Division of Veterinary Medicine, Iowa State College, Ames: "Trichomoniasis in Cattle and Its Control" and "X-Ray Therapy of Some Diseases of Animals."

Dr. W. O. Brinker, Department of Surgery and Medicine, School of Veterinary Medicine, Michigan State College, East Lansing: "Uses of Intramedullary Pins in Small Animals" and "Clinical Notes."

Dr. W. F. Fisher, Bureau of Animal Industry, Reno, Nev.: "Some Problems Encountered on Control and Eradication of Brucellosis in Range Cattle."

Dr. H. Stoddard, Laramie, Wyo.: "Damage Done to the Fertility of Range Bulls in Wyoming during Winter."

Dr. H. F. Schaulis, veterinarian in charge, U. S. Bureau of Animal Industry, Denver, Colo.: "The Foot-and-mouth Disease Situation in Mexico."

Dr. W. H. Mohler, Pathological Division, U. S. Bureau of Animal Industry, Washington, D. C.: "The Diagnosis of Anaplasmosis Through Complement-Fixation."

Dr. Lloyd C. Moss, Department of Medicine, Division of Veterinary Medicine, Colorado A. & M. College, Fort Collins: "Surgical Repair of Perineal Hernia."

Dr. Wayne Binns, Department of Veterinary Science, Utah State Agricultural College, Logan: "Activities of the Utah Brucellosis Advisory Committee."

Dr. James Lieberman, U. S. Public Health Service, Kansas City, Mo.: "The Role of the Veterinarian in Milk and Food Sanitation."

Dr. L. L. Madsen, Department of Animal Husbandry, Utah State Argicultural College, Logan: "Nutrition Problems with Range Livestock."

Dr. Rue Jensen, Department of Pathology, Division of Veterinary Medicine, Colorado A. & M. College, Fort Collins: "Pathology of the Bovine Foot."

s/M. L. MINER, *Secretary.*

Vermont

Business Meeting.—On Dec. 16, 1949, the Vermont Veterinary Medical Association held its annual business meeting in the Waterman Building at the University of Vermont in Burlington. Officers elected were Drs. C. A. Jordan, Newport, president; C. M. Miller, Orwell, first vice-president; J. E. Wheeler, Montpelier, second vice-president; and W. D. Bolton, Burlington, secretary-treasurer.

Since Dr. E. V. Moore, assistant commissioner of Agriculture and Markets, Albany, N. Y., was unable to be present, his paper "Livestock Public Health" was read by Dr. C. T. Whitney. Dr. David Hopkins, Brattleboro, Vermont representative to the 14th International Veterinary Congress, gave a report of the meeting and showed colored slides.

s/W. D. BOLTON, *Resident Secretary.*

Wisconsin

State Association.—The thirty-fourth annual meeting of the Wisconsin Veterinary Medical Association was held on Jan. 12-13, 1950, at the Schroeder Hotel in Milwaukee. The scientific program follows.

Dr. T. H. Ferguson, Lake Geneva: "Equine Practice." Drs. R. B. Hipenbecker, Fennimore, and G. A. Gettleman, Hartford, led the discussion of this paper.

Dr. J. E. McDermid, Ladysmith: "Equine and Bovine Stomatitis." The discussion was led by Drs. C. A. Brandly and W. R. Winner of Madison.

Dr. W. H. Dreher, Shawano: "Bovine Infertility." Drs. S. H. McNutt, Madison, and W. W. Arzberger, Watertown, led the ensuing discussion.

Dr. N. R. Brewer, University of Chicago; "Blood Clotting."

Dr. R. C. Klussendorf, assistant executive secretary, AVMA, Chicago: "Veterinary Medicine is Progressing, Are You?"

Drs. W. R. Winner and J. T. Schwab, chief, Division of Livestock Sanitation, State Department of Agriculture, Madison: "Animal Disease Control Programs in Wisconsin."

Dr. G. R. Spencer, Department of Veterinary Science, University of Wisconsin, Madison: "Systematic Treatments for Mastitis." The discussion was led by Drs. W. W. Wisnicky, Fond du Lac, and J. E. Lillesand, Verona.

Dr. G. R. Fowler, Department of Surgery, School of Veterinary Medicine, Iowa State College, Ames: "Surgery of Large Animals." Drs. S. E. Ferguson, Lake Geneva, and D. R. Edwards, Fox Lake, discussed this paper.

Dr. E. R. Krumbiegel (M.D.), commissioner of Health, Milwaukee: "Environmental Sanitation."

Dr. R. L. Kerns, meat sanitation supervisor, Milwaukee Health Department: Antemortem and Postmortem Meat Inspection."

Dr. Wayne H. Riser, Skokie, Ill.: "Canine Distemper."

Dr. R. E. Witter, College of Veterinary Medicine, University of Illinois, Urbana,: "The Management of Otitis Externa in the Dog."

Drs. W. H. Riser, moderator; R. E. Witter; F. W. Milke, Milwaukee; and E. A. Fortmann, Kenosha participated in a panel discussion "Diseases of Small Animals."

s/B. A. BEACH, *Secretary.*

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Northern Association.—On Oct. 26, 1949, the North Wisconsin Veterinary Medical Association met at the Conway Hotel in Appleton for a joint dinner and business meeting.

s/WILLIAM MADSON, *Secretary.*

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Southeastern Association.—The Southeastern Wisconsin Veterinary Association met in the Towne Hotel, Oconomowoc, on Dec. 7, 1949. Dr. Carl Brandley, University of Wisconsin, Madison, discussed "Necrotic Stomatitis in Wisconsin," and the Bureau of Animal Industry film "Foot-and-Mouth Disease" was shown.

s/ROBERT CURTIS, *Secretary.*

FOREIGN NEWS

Australia

Increasing Sheep Production.—Regarding an abstract from the address of W. S. Kelly which appeared on page 454 of the June, 1949, JOURNAL, Dr. Max Henry, secretary of the Australian Veterinary Association, calls our attention to the fact that our abstract would indicate that the proposed output of 25 per cent more mutton and lamb was something which could be attained in the near future. He informs us that this interpretation is not correct because much needs to be done before any such increase could be achieved.

Germany

Bovine Tuberculosis in Man.—Recent reports indicate that approximately 60 per cent of all cattle herds and 30 per cent of all individual cows in Germany are infected with tuberculosis. This bovine strain has been transmitted to human beings in many instances. In fact, it is reported (*Rheinische Post,* Sept. 23, 1949) that 1 to 9 per cent of all cases of human pulmonary tuberculosis and more than 30 per cent of all other types (bone, gland, joint, skin, and intestinal) are caused by the bovine tubercle bacillus.

s/M. W. ALTAFFER, *American Consul General.*

Spain

Seeks Correspondent.—A letter from a Spanish veterinarian who is studying English requests that he be put in touch with some American young man who is trying to improve

his knowledge of Spanish. It is hoped that a correspondence may be struck up which will be mutually beneficial to both participants. The inquirer may be reached at the following address:

Miguel Cordero del Campillo, Veterinario
Plaza de S. Martin 4 y 6
Leon, Spain

BIRTHS

Dr. (OSU '38) and Mrs. Charles Ozanian, Bellflower, Calif., announce the birth of a son, Charles Edward, on Sept. 27, 1949.

Dr. (MSC '49) and Mrs. E. H. Devereaux, Merrill, Mich., announce the birth of a son, William Howard, on Aug. 14, 1949.

Dr. (TEX '45) and Mrs. Dale D. Boyd, Pine Bluff, Ark., announce the birth of a daughter, Martha Diane, on Aug. 21, 1949.

Dr. (OSU '49) and Mrs. Stanley R. Keller, 5500 Glenway Ave., Cincinnati, Ohio, announce the birth of their fourth daughter, Linda Jane, on Nov. 14, 1949.

Dr. (UP '48) and Mrs. Frederick G. Ruder, Jr., Amherst, Mass., announce the birth of a son, Frederick G., III, Nov. 17, 1949.

Dr. (KSC '44) and Mrs. W. L. Good, Ponca City, Okla., announce the birth of John Michael on Nov. 21, 1949.

Dr. (COLO '46) and Mrs. Leon Slatko, Palestine, Texas, announce the birth of a son, Barton Elliott, on Nov. 25, 1949.

DEATHS

Kirby Bassett (UP '99), Woodbury, N. J., died Oct. 14, 1949. Dr. Bassett had been a member of the AVMA.

David C. Black (ONT '07), Fort William, Ont., died July 14, 1949.

★**Thomas Brazenall** (GR RAP '13), 69, Bury, Quebec, died in 1946. Dr. Brazenall was admitted to the AVMA in 1913.

Nathan N. Crawford (ISC '09), Baltimore, Md., died May 13, 1949. A federal meat inspector, Dr. Crawford was a member of the Maryland State Veterinary Medical Association and had been a member of the AVMA.

★**H. C. Glover** (ISC '85), 86, Fort Collins, Colo., died Jan. 11, 1950. An obituary appears on page 150 of this JOURNAL. Dr. Glover was admitted to the AVMA in 1903.

W. Ross Hodges (KCVC '12), 59, Ranger, Texas, died on Nov. 21, 1949, following a brief illness. Dr. Hodges had been a member of the AVMA.

Berton T. Hartnell (CVC '12), 64, Stacyville, Iowa, died Oct. 16, 1949. Dr. Hartnell had been a member of the AVMA.

Charles T. Higginbotham (CIN '18), 65, South Charleston, W. Va., died of a heart attack on Nov. 28, 1949. A past president and secretary of the West Virginia Veterinary Medical Association, Dr. Higginbotham had been employed by the government since 1921. He is survived by his wife, a daughter, and two sons.

Ray Hoefling (CIN '11), 60, Cincinnati, Ohio, died Oct. 28, 1949. Dr. Hoefling was a member of the National Association of BAI Veterinarians and had been a member of the AVMA.

Walter J. Jones (MSC '40), Scottdale, Pa., died Dec. 13, 1948. Dr. Jones was in general practice.

Berkley B. Killam (MC G '97), Yarmouth, N. S., died Aug. 18, 1949. Dr. Killam had been employed by the U.S. Bureau of Animal Industry for several years.

★**Hugh C. McCormick** (OSU '35), 38, Grand Rapids, Mich., died Aug. 21, 1949. Dr. McCormick served in the U.S. Army Veterinary Corps from 1942 to 1946. He was admitted to the AVMA in 1938.

Charles H. Paquin (ONT '00), 83, died at his home in Barre, Mass., on Oct. 6, 1949. Dr. Paquin practiced in Barre until he became associated with the Massachusetts Division of Livestock Disease Control in 1912. He will be remembered for his ability to induce coöperation among cattle owners during the early period of tuberculosis eradication. He was an honorary member of the Massachusetts Veterinary Association, and had been a member of the AVMA.

Raymond C. Rawlings (IND '21), Dutton, Mich., died Sept. 13, 1949. Dr. Rawlings specialized in poultry diseases.

★**Thomas B. Ricks** (SAN FRAN '11), 62, Scotia, Calif., died Aug. 13, 1949. Dr. Ricks was admitted to the AVMA in 1940.

T. R. Spratt (KCVC '13), 61, Monroe, Iowa, died of a heart attack early in November, 1949. Dr. Spratt was general practitioner.

Dewey E. Westmorland (IND '04), 69, Owensboro, Ky., died on Dec. 19, 1949. Dr. Westmorland had been state veterinarian for twenty years, and had also served as president of the U.S. Livestock Sanitary Board from 1942-1943. Dr. Westmorland had been a member of the AVMA.

William L. Williamson (MC K '98), San Francisco, Calif., died in September, 1949. Dr. Wiliamson was engaged in research on diseases of wild animals at the time of his death.

Jerry Wolfe (CVC '05), 74, Grand Mound, Iowa, died on Dec. 15, 1949. He was a charter member of the Eastern Iowa Veterinary Medical Association, and father of Dr. J. Wiley Wolfe, member of the faculty of the Veterinary Division, Oklahoma A. & M. College, Stillwater. Dr. Wolfe had been a member of the AVMA.

★Indicates members of the AVMA.

(Continued on Page 24)

An' Related Topics

WATCH YOUR ENGLISH AND OURS

CAPITALIZING (continued)

4) *Eponymic Names of Drugs et al.*—If the name of a drug contains a proper noun or proper adjective, as in the case of diseases, methods, stains, etc., only the proper element takes a capital letter:

Dover's powder, not Dover's Powder.
Epsom salt, not Epsom Salt.
Monsell's solution, not Monsell's Solution.
Bang's method, not Bang's Method.
Gram's stain, not Gram's Stain.
Peruvian bark, not Peruvian Bark.

Here again, careless writers and editors are prone to forget that the modified words (powder, salt, solution, method, stain, bark) being common nouns should not be capitalized.

5) *Proprietary Remedies.*—The name of a proprietary remedy, like any other mixture, is not capitalized in the best literature, regardless of the maker's protest on the ground that the capitalized trademark name used in advertising material should not be changed in scientific texts. The ruling is that blending molecules or mixing drugs does not make a proper noun of the whole. Anyhow, the worthy proprietary remedies finally lose their proper noun status. *Vide*:

argyrol	nembutal
lysol	pituitrin

and scores of others which medical dictionaries do not capitalize.

6) *Abbreviations of Common Nouns.*—The AVMA publications do not generally capitalize phrases that are not derived from proper names, such as:

a.m., not A.M.
p.m., not P.M.
m.l.d., not M.L.D. (minimum lethal dose).
p.p.m., not P.P.M. (parts per million).
n.p.n., not N.P.N. (nonprotein nitrogen).
p.p.d., not P.P.D. (purified protein derivative).

Neither should the following be capitalized: the directions b.i.d., q.i.d., t.i.d. of prescriptions and the foreign language abbreviations *e.g.*, *i.e.*, *n.b.*, *q.v.*, and the other handy terms commonly used in writing. The rule excludes college degrees (M.D., D.V.M.,

(Continued on page 24)

COMING MEETINGS

Notices of Coming Meetings must be received by 8th of month preceding date of issue

Virginia State Veterinary Medical Association. Winter meeting. Hotel Jefferson, Richmond, Va., Jan. 30-Feb. 1, 1950. Harry K. Royer, 1404 Main St., Lynchburg, Va., secretary.

Kansas Veterinary Medical Association. Annual meeting. Jayhawk Hotel, Topeka, Kan., Jan. 30-Feb. 1, 1950. Olin W. Morris, 204 N. 32nd St., Parsons, Kan., secretary.

Illinois State Veterinary Medical Association. Annual meeting. Pere Marquette Hotel, Peoria, Ill., Feb. 1-3, 1950. A. G. Misener, 6448 Clark St., Chicago 26, Ill., secretary.

New Jersey, Veterinary Medical Association of. Annual meeting. Hotel Hildebrecht, Trenton, N. J., Feb. 2-3, 1950. J. R. Porteus, Box 938, Trenton, N J., secretary.

Alabama Veterinary Medical Association. Houston Hotel, Dothan, Ala., Feb. 17-18, 1950. I. S. McAdory, Alabama Polytechnic Institute, Auburn, Ala., secretary.

Colorado A. & M. College Veterinary Conference. Colorado A. & M. College, Fort Collins, Colo., Feb. 20-22, 1950. Floyd Cross, dean.

American Animal Hospital Association. Annual meeting. Shirley Savoy Hotel, Denver, Colo., April 24-27, 1950. W. H. Riser, 5335 Touhy Ave., Skokie, Ill., executive secretary.

Alabama Polytechnic Institute, twenty-sixth annual conference for veterinarians. Alabama Polytechnic Institute, Auburn, Ala., June 8-10, 1950. R. S. Sugg, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., dean.

Wisconsin Postgraduate Conference for Veterinarians. University of Wisconsin College of Agriculture, Madison, Wis., June 21-22, 1950. C. A. Brandly, University of Wisconsin College of Agriculture, Madison 6, Wis., chairman.

American Society for the Study of Sterility. Sir Francis Drake Hotel, San Francisco, Calif., June 24-25, 1950. Walter W. Williams, 20 Magnolia Terrace, Springfield 8, Mass., secretary.

Northwest Veterinary Medical Conference. Annual meeting. Winthrop Hotel, Tacoma, Wash., July 17-19, 1950. J. L. Ellis, 2022 E. 4th St., Olympia, Wash., secretary.

(Continued on page 24)

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Supplied in 15% sterile solution, bottles of 100 cc., rubber capped.

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(Continued from page 22)

A.M., B.A., etc.) when used as part of a personal title. But write these out uncapitalized in running text: doctor of medicine, bachelor of arts, master of arts, etc.

(Continued from page 22)

United States Livestock Sanitary Association. Annual meeting. Westward-Ho Hotel, Phoenix, Ariz., Nov. 1-3, 1950. Dr. R. A. Hendershott, 1 West State St., Trenton, N.J., secretary.

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. Russell P. Cope, 1205 San Pablo Ave., Berkeley 6, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Thomas Eville, Route 1, Box 136H, Fresno, Calif., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. O. A. Soave, 5666 Telegraph, Oakland, Calif., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

(Continued on page 26)

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spray powder contains correct proportions of sulfanilamide, sulfathiazole, urethane and acid boric. Widely used and recommended for cankerous ear conditions, pink eye, and as a topical wound dressing.

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(Continued from page 24)

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. W. C. Schofield, Dept. of Animal Pathology, Ralston-Purina Co., St. Louis 2, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Wednesday of even-numbered months. R. A. Case, 400 S. Garden St., Peoria, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind, secretary.

Jefferson County Veterinary Society, Louisville, Ky., the first Wednesday evening of each month. F. M. Kearns, 3622 Frankfort Ave., Louisville 7, Ky., secretary.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., the fourth Wednesday of each month. Raymond C. Snyder, N. W. Cor. Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Massachusetts Veterinary Association. Hotel Statler, Boston, Mass., the fourth Wednesday of each month. C. L. Blakely, Angell Memorial Animal Hospital, 180 Longwood Ave., Boston, Mass., secretary-treasurer.

Michiana Veterinary Medical Association. Hotel Elkhart, Elkhart, Ind., 7:00 p.m., the second Thursday of each month. R. W. Worley, 3224 Lincoln Way West, South Bend, Ind., secretary.

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

(Continued on page 28)

Friskies

Authoritative information on the scientific care and feeding of dogs. Published by Albers Milling Company (a division of Carnation Company) under the supervision of Dr. E. M. Gildow, B.S., M.S., D.V.M., Director of Research.

No. 2

DOG RESEARCH NEWS

Dogs vs. Human Nutrition

Prior to the advent of commercial dog food, dogs usually ate the same food as their owners – scraps from the table, and soup bones from the butcher. A study of the nutritional disturbances of dogs on these diets also shows that they suffered from most all the nutritional disturbances (scurvy excluded) affecting humans!

Extensive research indicates that these nutritional deficiency disturbances in dogs were not caused by poor digestion of the nutrients, carbohydrates and fats–*but by a lack of balance of essential nutrients in the diet!*

Albers has pioneered in developing food for dogs that corrects this lack. Friskies is not only nutritionally *complete*–it is a *perfectly balanced* combination of every food element a dog is known to need.

Fat Adds Palatability

If the ingredients of a commercial dog food are fed in separate pans, the dog will usually eat the fat first – *even before the meat portion!*

But how much fat should be in a complete dog food? Excessive amounts will reduce the total amount of food eaten for normal condition, and thus restrict the balance of nutrients consumed. Actually, dogs thrive on diets very low in total fat.

The amount of fat in Friskies is the result of extensive palatability trials, and nutrition tests covering generations of dogs of all breeds. Friskies provides the correct proportion of fat to (1) aid in the digestion of protein; (2) increase palatability; (3) help the assimilation of fat soluble vitamins; and (4) provide high energy value.

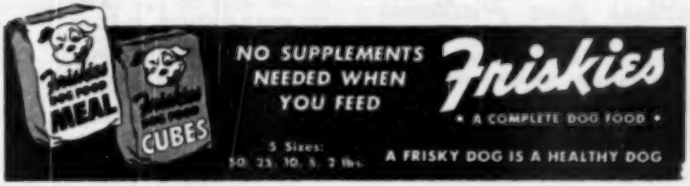
"Hot Spots"

Dermatitis, eczema – or in the dog man's language, "Hot Spots"–is a constant problem. Friskies Research Kennels has prepared a complete analysis and review of the subject. Write for a copy.

What's Your Question?

DR. E. M. GILDOW

Send your questions about dog breeding, feeding and care to Friskies Research Kennels, Carnation, Washington. The knowledge gained during 17 years of scientific research is yours for the asking.



(Continued from page 26)

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. C. Edward Taylor, 2146 South Broad St., San Luis Obispo, Calif., secretary.

New York City Veterinary Medical Association. Hotel Statler, New York, N. Y., the first Wednesday of each month. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. I. N. Bohlender, Box 588, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. James R. Ketchersid, 666 East Highland Avenue, San Bernardino, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. E. W. Paul, Box 866, Redwood City, Calif., secretary.

Redwood Empire Veterinary Medical Association, the second Tuesday of every other month. Charles D. Stafford, Novato, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the fourth Friday of each month. R. C. Goulding, 11511 Capitol Avenue, Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. R. J. McFarland, 3621 Jewell St., San Diego 9, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. D. H. McDole, 8674 Melrose Ave., Los Angeles 46, secretary.

South Florida Veterinary Society, the third Tuesday of each month, 8:00 p.m., at the Peckway Skeet Club. Robert P. Knowles, 2936 N.W. 17th Ave., Miami, Fla., secretary.

One service which the practicing veterinarian has to sell above all else is diagnosis. —*K. W. Smith, D.V.M., Iowa.*

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Wanted—Veterinarians

Veterinarian wanted for exclusive small animal practice in Chicago area. Give all details in first letter. Address Dr. M. J. Scala, 580 Campbell Ave., Highland Park, Ill.

WANTED — Veterinarian to assist in general practice mostly large animals, dairy, horse work predominating. Give full particulars in letter, stating salary, marital status, etc. Address "Box R 12," c/o Journal of the AVMA.

Hard-working assistant for small animal hospital in Michigan. Experienced in sterile surgery. State salary expected, experience, and training. Address "Box R 15," c/o Journal of the AVMA.

WANTED—Married, experienced veterinarian for small animal hospital in New York City. New York state license necessary. Permanent position, living quarters available. Starting salary $125 per week. Address "Box R 4," c/o Journal of the AVMA.

WANTED—Veterinary assistant for small animal practice in Chicago suburb. In replying, please include age, marital status, small animal experience, and salary expected. Address "Box R 5," c/o Journal of the AVMA.

Veterinarian for mixed practice, not afraid to work. Must have car. Prefer recent graduate. Completely modern clinic in western Oregon town. Give all details and expected salary in first letter. Address "Box Q 8," c/o Journal of the AVMA.

California State Department of Agriculture needs graduate veterinarians for meat inspection and field work. License and residence requirements waived. Starting salary $358. Liberal benefits. Address State Personnel Board, 1015 L Street, Sacramento, Calif.

Assistant wanted part time, Saturdays 8 to 4; Sundays 10 to 12. Address Dr. A. M. Collins, 5732 W. Cermak Road, Cicero, Ill. Phone Olympic 1040.

Wanted—Practices

WANTED TO BUY—A good mixed or small animal practice with hospital and home. Give details, including photo, in first letter. Address "Box Q 18," c/o Journal of the AVMA.

(*Continued on page 32*)

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(Continued from page 30)

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Wanted—Positions

Small animal assistantship with future. Conscientious, experienced, willing. Married, 26, 6 ft. tall. Ontario Veterinary College graduate next May. Will interview practitioner immediately, if necessary. Address "Box R 16," c/o Journal of the AVMA.

English graduate veterinarian, married, age 34, with ten years' extensive experience, general practice and research in Britain and South Africa, seeks senior appointment in general practice, commercial firm, or hospital. Accommodations essential. Partnership if mutually satisfactory. Reply air mail to Dr. H. E. Williams-Jones, Moreson, Durbanville, Cape, South Africa.

Graduate accredited college, excellent small animal experience, some experience in dairy practice, desires position in small animal or mixed practice. Prefers location in southeastern state, but will consider any area. Address "Box R 1," c/o Journal of the AVMA.

Veterinarian, 42 years of age, 1934 graduate of Switzerland university, seeks work anywhere available. Capable veterinary surgeon; former teacher of animal husbandry. Address Dr. Kazys Alminas, 98 Colt St., East Hartford, Conn.

POSITION WANTED—In Massachusetts, by graduate veterinarian with six years' experience. Married, reliable, not afraid of hard work. Prefer small or mixed practice. Address "Box Q 11," c/o Journal of the AVMA.

Veterinarian, graduate of Polish veterinary school, 14 years' practical experience, dependable, hard worker, desires assistantship with established veterinarian. Speaks English. Low salary to start. Address Dr. J. Roman, 109 Riverside Drive, Piqua, Ohio.

Position wanted for summer of 1950 by student in junior year at veterinary school. Prefer to work with practitioner with mixed or general practice in midwest area. Address Sherman R. Purvis, 143 Mason Hall, Michigan State College, East Lansing, Mich.

Position wanted as assistant in any veterinary work, by a European veterinarian, single, 38 years old. Address Dr. Joseph Skokowski, 1536 Fairmount Ave., Philadelphia 30, Pa.

1949 graduate of recognized school desires position as assistant, preferably leading to eventual acquisition of practice. Southwest or Pacific Northwest preferred. Address "Box R 8," c/o Journal of the AVMA.

Graduate veterinarian, three years' experience mixed and small animal practice, age 30, married,

(Continued on page 34)

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(*Continued from page 32*)

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FOR SALE—Mixed practice in northwestern Pennsylvania. Small house, hospital, real estate; in small town; excellent location. Reasonable; leaving because of health and other interests. Address "Box R 2," c/o Journal of the AVMA.

FOR SALE—Well-established large animal practice in California, together with acreage and income property. Excellent opportunity for someone with ambition. Reasonable terms to the right party. $10,000 down payment. Address "Box Q 9," c/o Journal of the AVMA.

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FOR SALE—Small animal hospital located in Chicago. Established over five years. No real estate involved. Reasonable; terms. Address "Box Q 7," c/o Journal of the AVMA.

FOR SALE—Well-established large animal practice in desirable part of California. Apartment, office, and stables can be leased reasonably. Only sincere, competent large animal man with moderate capital need apply. Might consider leasing practice to right man. Address "Box Q 10," c/o Journal of the AVMA.

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(*Continued on page 36*)

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Notice to Contributors

Journal of the AVMA

and the

American Journal of Veterinary Research

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals.

Manuscripts.—Manuscripts must be typewritten, double-spaced, and the original, not the carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise and to the point. Short, simple sentences are clearer and more forceful than long, complex ones. Footnotes and bibliographies also should be typed **double space** and should be prepared in the following style: name of author, title of article, name of periodical with volume, month (day of month, if weekly), and year.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the Journals with a minimum of reduction. Photomicrographs which cannot be reduced should be marked for cropping to 1-column or 2-column width. Drawings should be made clearly and accurately in India ink on white paper. Figures appearing on graphs or charts should be large enough to allow for reduction necessary for the chart or graph to fit on Journal pages. All illustrations should bear the name of the author on the back.

Tables.—Tables should be simple. Complex tables are not conductive to perusal. It is wiser to summarize complex material rather than to attempt to tabulate it.

News.—Secretaries of associations and readers are requested to send us announcements of meetings and news items.

Anonymous Letters.—Anonymous communications, of whatever nature or purpose, to the JOURNAL or to the Association will not be published or referred for consideration to any Association official or committee.

AMERICAN VETERINARY MEDICAL ASSOCIATION

600 So. Michigan Avenue

Chicago 5, Illinois

(Continued from page 34)

The number of sheep in the United States dropped to an all-time low in 1949—35 per cent fewer than for the 1938-1947 average. —*From California Wool Grower.*

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The MacAllan Ear Cropping Form, affixed to the ear, provides an accurate pattern against which to cut with knife or razor blade. Form fits firmly, cannot move or slip when clamped into proper position.

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